

The IRON AGE

September 19, 1957

A Chilton Publication

The National Metalworking Weekly



Steelmaking

Gets Set

For Tomorrow P.139

Special Report

On Steel Expansion — P. 99

**How Defense Cutbacks
Will Affect You**

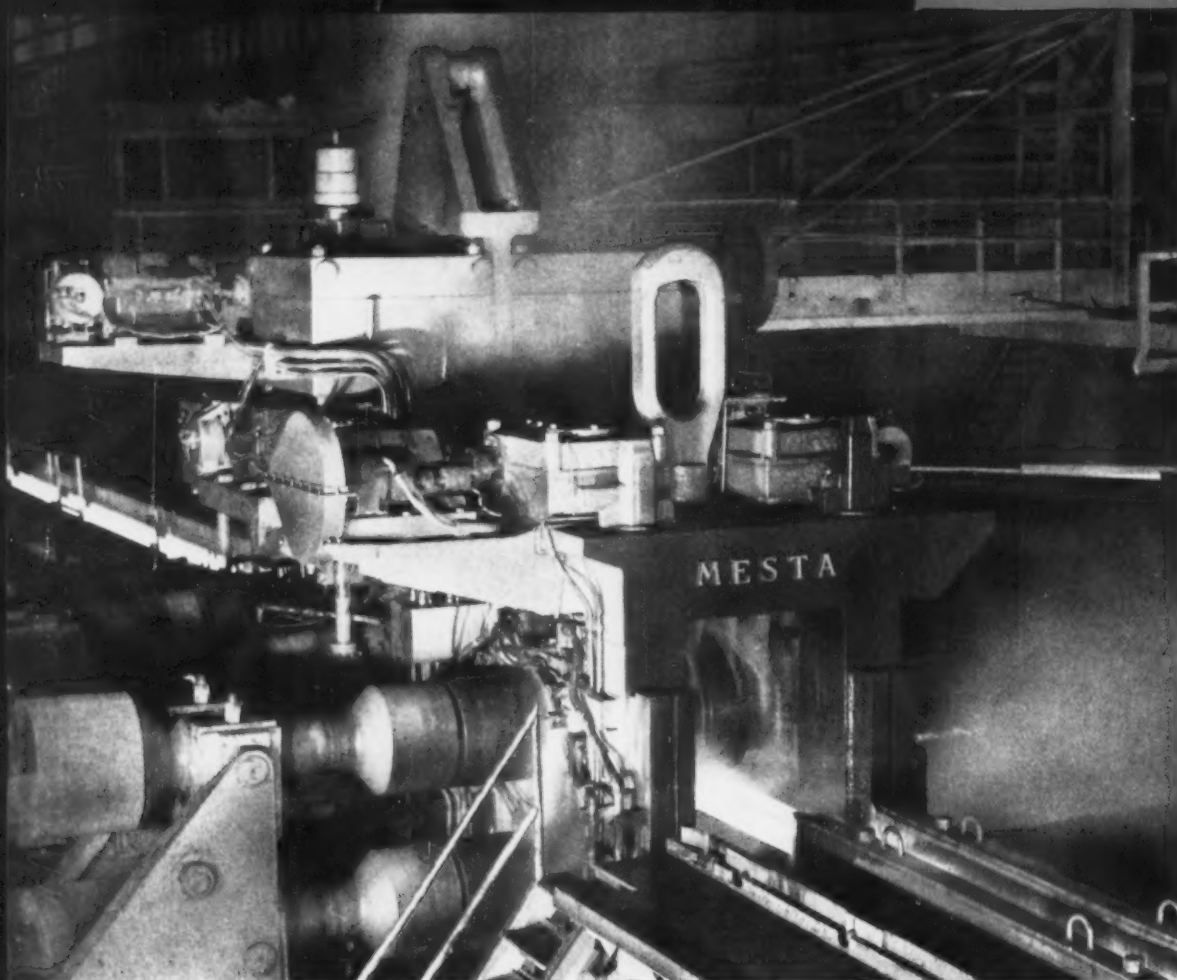
— P.104

Digest of the Week

P. 2-3

WIDE FLANGE BEAM AND STRUCTURAL MILLS

Designed and Built by
MESTA



MESTA Universal Structural Mill rolling wide flange beams on the 44" Universal Stand and the 34" Edging Stand at Inland Steel Company, Indiana Harbor Works

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY
PITTSBURGH, PENNSYLVANIA





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STEEL



THE IRON AGE
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The IRON AGE

September 19, 1957—Vol. 180, No. 12

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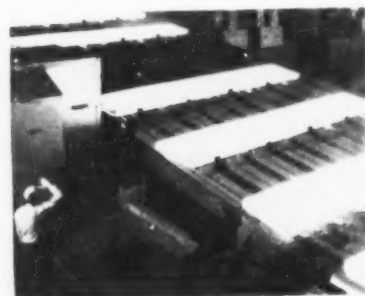
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STEEL EXPANSION

Emphasis on Economy—Climb-
ing costs have hit steel expansion
programs as they have everything



else. To offset inflation, mills are
hunting new ways to get more out-
put from existing units. Sinter,
oxygen, and oxygen converters play
an important role. P. 99

COST CUTTING

Total Approach—Cost cutting
starts with the very design of your
product and continues through the
shipping dock. One vital element
is a well-trained cost reduction
team. P. 103

DEFENSE CUTBACKS

No Drastic Effects—Despite Pen-
tagon's decision to limit military
spending, metalworkers will be able
to sell about the same areas and
the same buyers. One important
exception: secondary suppliers to
the aircraft industry. They'll need
to scout around for new custo-
mers. P. 104

Metalworking



STEELMAKING PLANS: U. S. Steel's Dr. E. C. Bain (right), assistant executive vice president, and M. R. Faigen, assistant technologist, examine ore pellets at Monroeville research center. Keeping close tab on new processes is important phase of industry's planning. P. 139

BEARINGS PLANT

It Breaks Tradition—Timken's new installation at Bucyrus, O. features some innovations in production and labor relations. It pays off for the firm and its customers too. P. 107

UNION CORRUPTION

Cleanup Coming—An aroused Congress is almost certain to saddle unions with cleanup legislation unless they start doing it themselves. P. 121

FEATURE ARTICLES

LICK CASTING PROBLEMS

With Combined Methods—A germ of an idea that's actually quite old is beginning to find wider use among founders. It's combining the attributes of several processes into a single scheme. By so doing, a lot of castings are coming out of the "impossible" category and into routine production. A case in point is the casting for the main body of a jet engine valve. P. 145

LOAD CELL WEIGHING

For Molten Metal—Weighing molten metal charges is rough on mechanical weighing systems. It's the unavoidable hot spillage, dirt and grime that cause the abuse. By using electrical load cells with a remote indicating system, you get a trouble-free system that's less subject to damage. Operator can read the indicated weight at any time during the pour. P. 148

GALVANIZING

New Methods Step In—Where galvanizing is an old established process, it has been only recently that mechanization found a foothold. It shows in modern pickling procedures for a better job of cleaning. In the actual galvanizing, strip lines have looping pits to make the process continuous. P. 150

PLATING LINE

Better Corrosion Resistance—The protective finish on a product is a gage of quality, especially when it serves under corrosive conditions. It takes careful choice of plating process to get an economical finish. One company has chosen a new, direct bright-nickel plating process for its product. P. 154

MARKETS & PRICES

INSTRUMENTS

Cleveland Show—Twelfth annual exhibit of Instrument Society of America displayed many new devices that can aid metalworking. Size and scope range from tabletop to cross-country. P. 108

AUTO TAIL FINS

They're Functional, Too—Squelching widespread belief that tail fins are just a styling gimmick, Chrysler's Virgil Exner explains their aerodynamic functions. And there's little doubt that fins help sell cars. P. 116

ELECTRONICS BOOM

Missiles Are the Spur—Military electronics manufacturers, because of the swing from manned aircraft to guided missiles, see their business booming. Western firms who made 25 pct of the sales in 1956 are ready for it. P. 123

AUTOMATIC DRILLING

New Machine Unveiled—A Detroit machine builder comes up with a fully automatic piece of equipment that bypasses need for hand layout. Fast positioning, opposed spindles reduce job time. P. 125

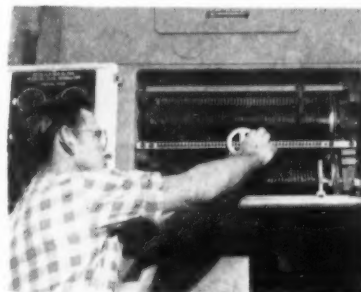
STEEL MARKET

Building Up Slowly—Steel sales are slowly but steadily gaining strength. Some automakers continue to drag their heels. P. 189

NEXT WEEK

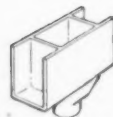
AUTOMATION

For Small Plants—The average-size firm can profit from automation, but it must use a different approach than do the giants of industry. Next week's cover story will show how Solar Aircraft Co. brought automation into its shops.





Hammer or Press.....

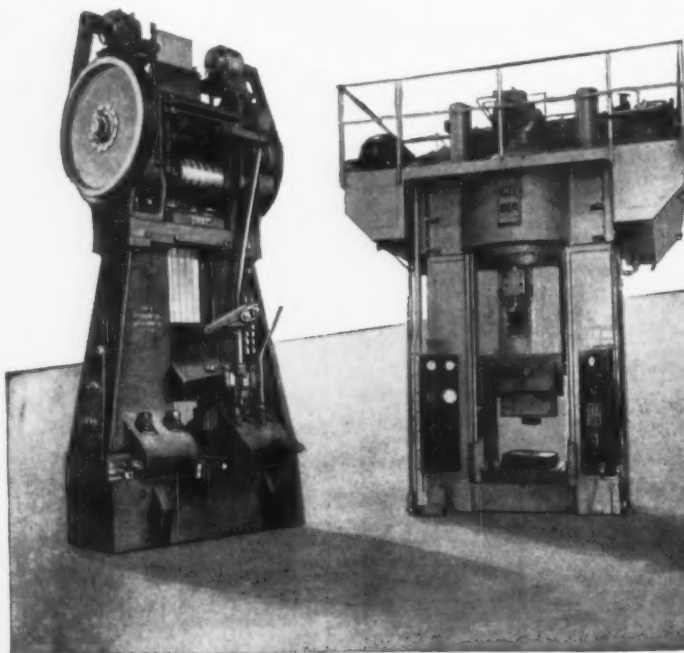
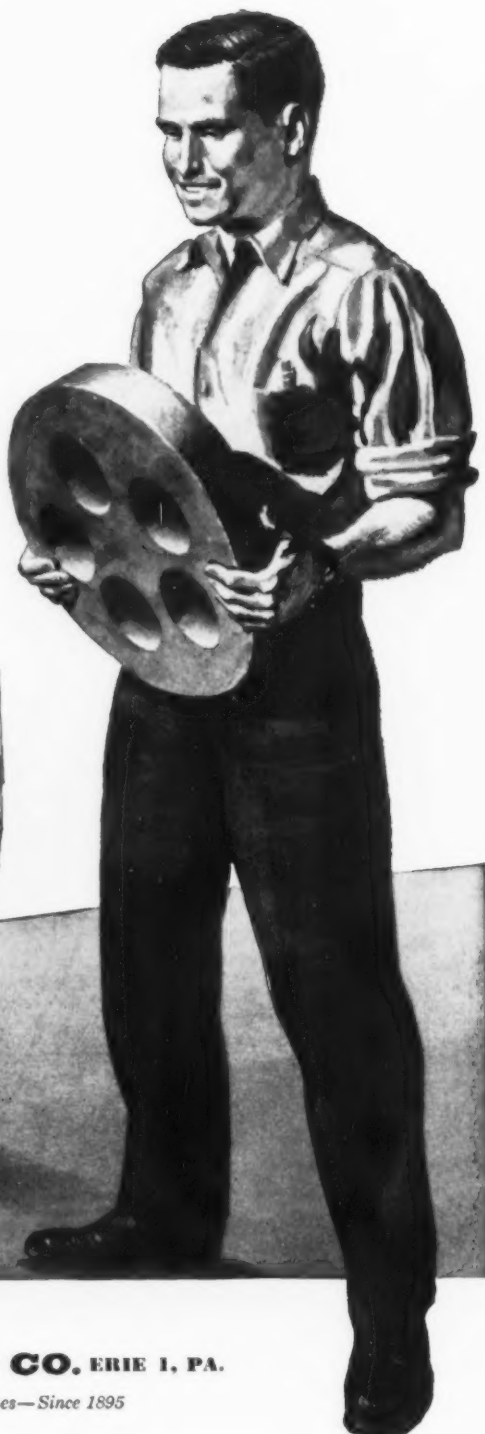


which is best for your forged product?

Hammers forge some pieces more efficiently than presses; presses work some forgings better than hammers. What is a forging man to do? Easy! Talk with the firm that makes the best in both hammers and presses . . . talk with Erie Foundry Company. We will help you with expert specific advice on the right machine for your forging requirements.

In one instance, Eaton Manufacturing Company's (Marion, Ohio) forge plant decided on this Erie 10,000-lb. Board Drop Hammer to forge 68-lb net flat-back ring gears, 16" in diameter—in a single impression die, straight down, without blocking or pancaking. And, in another instance, Kaiser Aluminum's (Erie, Pa.) forge plant decided to use this Erie Foundry Hydraulic Forging Press with electromagnetic controls, to produce in quantity, their no-draft forgings.

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Russian Roulette: It Is A Risky Business

Russian roulette is pulling the trigger on a pistol that is loaded with one bullet. You gamble that the time you pull the trigger the gun won't go off. Are we playing this game as a nation?

We have been "assured" that the Reds are only trying to scare us with their intercontinental ballistic missile talk. Our top people are bringing out the old chestnut: "We knew it all the time". Or, "We are ahead of them but we've said nothing about it".

Fine! We hope that is true. But even if it is—it proves nothing. We are too complacent. At first we had the A-bomb. We were to keep ahead with it for years. We didn't. Then we had the H-bomb (only after a few loyal atomic scientists proved to Mr. Truman that we had to have a crash program).

Not many—even in high circles—felt that the Reds would catch up to us on the H-bomb as fast as they did. Ridicule and knowing sneers greeted the Russian announcement several years ago. Then came the sickening proof from our own Atomic Energy Commission.

The Reds have the ICBM! Of course the fight for supremacy in the missile field is far from won. But it looks as though the Reds are ahead of us.

Maybe they aren't. Let's say they are just up to us. What does that mean?

We are still fumbling around with the defense budget on a fiscal basis; not on a survival basis. Research and competition in the missile field is being hamstrung. Interservice feuds preoccupy some of the top brass.

No one wants a new world war. No one wants the elimination of civilization as we know it. Everyone wants peace. They always have. But wars did break out. No one wants abject slavery in the world. No one wants to see Communism triumph over all. And no one wants a world beaten and crushed as Hungary is.

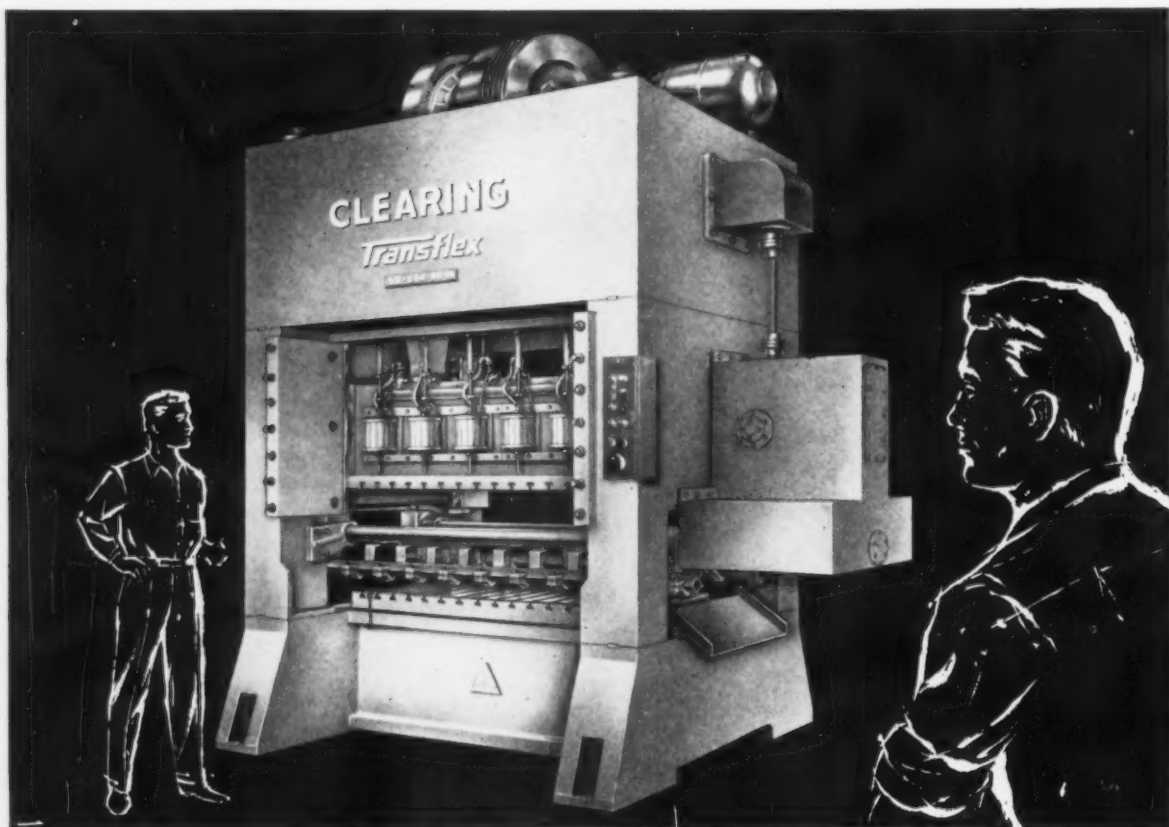
The Reds are feeling their oats. When men or nations feel their oats they get cocky. When they get cocky they lose judgement. When they lose judgement all hell can break loose.

The United States has fallen behind somewhere. It is now playing Russian roulette. It is time to recover.

Only the strongest nation in the world—ready for any and all crises—can withstand the Red lunatic-fringe who could, and might, set the world on fire.

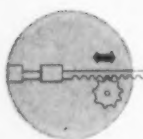


Editor-in-Chief



Press automation for small parts at moderate cost?

Yes, with a Clearing
Series-S
Transflex Unit



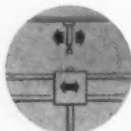
Operating station
center-distances
are variable.

Feed fingers readily
adjust for different
sizes of parts.



Die cushions are ad-
justable right to left.

Knockout positions
adjust right to left.



Transflex—transfer feeding plus the ability to produce a variety of parts—has now been applied to Clearing Series-S presses. These moderate priced straight side presses are produced in capacities from 75 through 300 tons.

These presses have all the major adjustment features typical of all Transflex units. In addition, provision is made for fast detachment of the finger bars so that die changes are quick and easy. Feed change-over—as required from part to part—is practically instantaneous.

As a result, it is now possible for manufacturers with requirements for a number of different medium size parts to automate production even when runs are not long. These presses bridge the gap between progressive die production and the conventionally large transfer presses. It is possible to have as many as sixteen die stations on a single press of this type.

A press like the one above can provide your plant with press automation *plus flexibility* of production at a cost that heretofore would have been considered impossible. We have a great deal of information on Transflex available. It's yours for the asking.

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LETTERS FROM READERS

The Big Hole

Sir—In your Aug. 15 issue you feature an article on "Trepanning." This interesting, though not very informative, article contained a statement, to which I for one, take strong exception. You state, "Trepanning, first introduced to the U. S. after World War II, etc." This is quite incorrect, unless you are qualifying the statement related to the size of the workpiece and diameter of the bore.

I have successfully applied this method prior to, as well as during World War II on aircraft parts, notably during the years of 1943 through 1945, while Chief Engineer for Esmco Auto Products.

A correction in a future issue should be forthcoming, since I feel very strongly, that our production know how and ability is equal or better than any in the world.—F. Samuel, Production Mgr., Harman-Kardon, Inc., Westbury, Long Island, N. Y.

■ Our reference was to large diameter work.—Ed.

Sloppy Assembly?

Sir—I read Mr. Neal's statements about automotive workmanship in your Aug. 15 issue, p. 68, and was not too surprised at the sweeping generalities he brought out. It is only natural that no derogatory comments about the growing cancer of the auto industry would come from the car makers themselves. No mention was made of the widely known fact that many automobile engineers employed by the car makers know that a better car can be made today in Detroit. The main reason why it is not done is that policies are dictated by the sales departments and override engineering requirements for at least reasonable car quality and good workmanship. In their insane desire for more and more production the car makers insist on high styl-

ing, high horsepower, and little else, and the hell with car quality, the hell with the car owners' aggravation caused by the repeated expense and loss of valuable time in having various factory-built defects repaired after the new car guarantee is up.

It is unfortunate that the dollar volume of advertising placed by the auto industry prevents any mention in print about this state of affairs. There is a noticeable taboo about mentioning the fact that we are getting less and less car value for more and more money each year. Reporters everywhere seem to shy away from any frank exposure of the glaring facts.—R. Blagden, East Hampton, Conn.

■ We feel you get what you pay for. If you want fine coachwork, thoroughly tested mechanical elements, etc., you buy a Mercedes, Ferrari, Rolls, Maserati, etc. But at what a price!

Apparently more people want power and glamor than 100 pct inspection and test. Adjusting for inflation, we'll stack up our '57 model against any comparable '47 model for a contrast in roadability and performance.—Ed.



"I don't care if you didn't get the right change, Sommers, you're still going about it all wrong."

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tapping screws

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ON ASSEMBLY

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Roll Thread Carriage Bolts • Dowel Screws
Hanger Bolts • Wood & Type U Drive Screws



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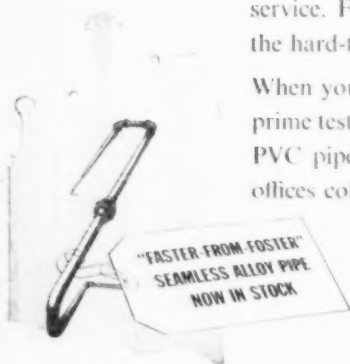
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FATIGUE CRACKS

After Bessemer

Just a little over 100 years ago, Sir Henry Bessemer was tinkering with an idea destined to make him famous. In the summer of 1856, he disclosed his discovery in a lecture that bore the modest title; "On the Manufacture of Malleable Iron and Steel." Equally as modest was the inauguration of American steelmaking in the following year.

With understandable pride, our friends in AISE are planning to commemorate these events when they meet in Pittsburgh, Sept. 23 through 26. But while steel engineers pay tribute to the past, they'll be taking a long look at the future.

Looking Forward — The future of steel making is one of our favorite subjects also. And for a glance at that future, we recommend the roundup "Steelmaking Plans For Tomorrow." It starts on p. 139. Where it ends, steelmaking's future that is, we're not sure. But we've traced the significant trends, beyond that, it's a field day for the metallurgical crystal ball.

For the short-term view of what the steel industry is doing we suggest you read this week's special report on p. 99. Here you'll find

what mills are doing to increase output from present facilities; how much ingot and finishing capacity was added in the last year and what ingot capacity will hit by 1959.

Puzzlers

Nobody, but nobody, even B. Gimbel, answered the worm puzzler. But we received 56,789 requests for the right answer. Here it is: He was only a baby worm. He couldn't count. Brother!

And how about the clock puzzler. The one about a clock that takes six seconds to make six strokes and how long will it take to make twelve strokes? Answer: 13 1/5 seconds. Winners: R. W. Hautzenroeder, Massey-Harris-Ferguson, Inc., Detroit; and friend Jim Mull, The North American Manufacturing Co., Cleveland. And GSCC, and we know who that is.

Der Geschuttenwerkes

The rocket and missile boys are evolving new words, not unlike fractured French. You've probably seen some. We particularly like this sample extracted from "Kaiser Builder," Kaiser Engineers house magazine:

Nuclear Research
Preliminary Design
Administration
Rocket Engine

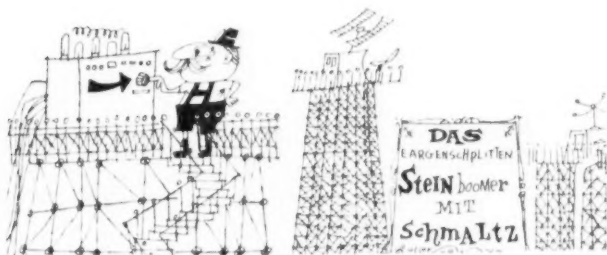
Design
Project Engineer
Management

Nuclear Warhead
Hydrogen Device

Das Whiskidden grupe.
Das Uppen-das-klaudsén grupe.
Das Oudtgeschmardten grupe.
Firenschpitter mid schmoken-und-schnorten.

Das Raundschoiber und Reddischeiz grupe.
Das Schwettenoudter.
Das Ulzerenbaldden grupe.

Das cargeschplitten laudenboomer.
Das cargeschplitten laudenboomer mit ein grosse hollengraund und alles kaput.



PROBLEM:

Finish

JATO cases
inside and
out...
automatically



ANSWER:

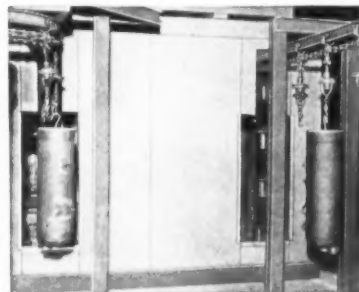
CALL IN

Cincinnati

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CINCINNATI CLEANING and FINISHING
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2017 Hageman St., Cincinnati 41, Ohio





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hook or bucket...
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speeds the job**

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BROWNHOIST

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GIVES A LIFT TO
AMERICAN INDUSTRY



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HEAT TREATED OR
PLAIN**



SIMONDS has over 60 years' experience in cutting quality industrial gears. We can supply any type of gear in cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite in a full range of sizes adaptable to the material. Also heat-treated, case or flame hardened gears of carbon or alloy steel. Send us your requirements for quotation.

Custom GEAR CUTTING

SIMONDS' facilities can produce any type of custom gear from your blanks if you prefer. Same quality . . . same prompt service.



QUALITY
GEARS
FOR OVER
65 YEARS

SPUR GEARS
BEVEL GEARS
MITRE GEARS
WORMS WORM GEARS
RACKS PINIONS

Also stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

**SIMONDS
GEARS**

**THE
SIMONDS
GEAR & MFG. CO.**

LIBERTY at 25TH PITTSBURGH 22, PA.

EXHIBITS, MEETINGS

Packaging & Handling Show—Oct. 28-31, Atlantic City. (SIPMHE, One Gateway Center, Pittsburgh 22.)

AtomFair '57—Oct. 28-31, New York. (Atomic Industrial Forum, 3 E. 54th St., N. Y. 22.)

Metal Show—Nov. 2-8, Chicago. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

SEPTEMBER

Steel Founder's Society of America—Fall meeting, Sept. 23-24, The Homestead, Hot Springs, Va. Society headquarters, 606 Terminal Tower, Cleveland.

American Machine Tool Distributor's Assn.—Annual meeting on serving tomorrow's markets, Sept. 23-24, Hotel Cleveland, Cleveland. Society headquarters, 1900 Arch St., Philadelphia.

The American Society of Mechanical Engineers—Fall meeting, Sept. 23-25, Statler Hotel, Hartford, Conn. Society headquarters, 20 W. 39th St., New York.

Standards Engineers Society—Sixth annual meeting on standardization—economy through application, Sept. 23-25, Hotel Commodore, New York. Society headquarters, P. O. Box 281, Camden, N. J.

Assn. of Iron & Steel Engineers—Annual Convention, Sept. 23-26, Penn Sheraton Hotel, Pittsburgh. Society headquarters, 1010 Empire Bldg., Pittsburgh.

American Hot Dip Galvanizers Assn.—Semi-annual meeting, Sept. 26-27, Netherland - Hilton Hotel, Cincinnati. Society headquarters, 1806 First National Bank Bldg., Pittsburgh.

National Screw Machine Products Assn.—Fall membership meeting. (Continued on P. 16)

bonding mortars FOR THE STEEL INDUSTRY

Grefco offers a wide variety of air-setting and of heat-setting high temperature bonding mortars of both the dry and wet varieties. Here are just a few:

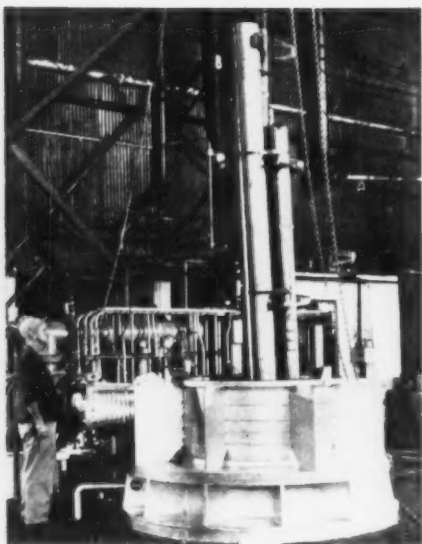
BRIKLOK is a super duty, air-setting, fireclay base mortar which sets hard and develops high strength merely upon drying. It is widely used for laying, coating and patching fireclay and silica brickwork. BRIKLOK has good resistance to slag and abrasion and withstands temperatures up to 3056°F. BRIKLOK A is a wet mixture while BRIKLOK is furnished as a dry powder.

GREFCO SILLIMANITE is a highly refractory mortar with a base material consisting mainly of mullite crystals. This insures very high refractoriness and freedom from shrinkage at high temperatures. This high quality mortar is recommended for laying up and coating fireclay, high alumina or SILLIMANITE brick, and should always be used wherever a mortar is required for the latter.

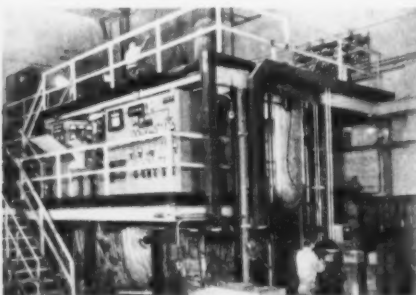
SILLIMANITE 343 is a wet air-setting mixture. **SILLIMANITE 340** is a dry heat-setting mixture. Consult your Grefco representative as to which of the several varieties best suits your needs.

GENERAL REFRACTORIES COMPANY
Philadelphia 2, Pa.

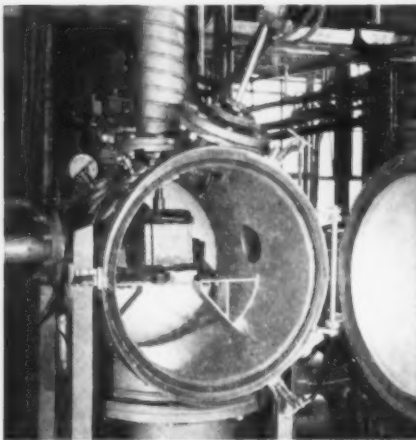




Vacuum Resistance Pit-type Furnace, used by Rem-Cru Titanium, Inc., to heat treat titanium mill products up to 12 ft. long by 4 ft. wide. Standard resistance furnaces available in bell, pit, and horizontal muffles with hot zones from 2" to 54" I.D.



Vacuum Induction furnace with 3000 pounds capacity, installed at Crucible Steel Corporation of America. Capacities of standard induction furnaces range from 12 to 5000 lbs. of molten steel.



Vacuum Arc Furnace has interchangeable consumable and nonconsumable electrodes for melting into either cold mold or skull for titanium shape castings. Standard arc furnaces available from 10 to 10,000 lbs.

Why Put "Two-Bit Performance" in a \$1,000,000 Product?



For about two bits you can get a pound of air-melted 52100 alloy steel. However, impurities introduced by air-melting are a prime cause of failure in high stress or high temperature parts. Vacuum-melted 52100 costs nearly \$2.00 more, but what a difference in performance! For instance, it adds 600% to the life of a jet engine thrust bearing. And because it is "cleaner" and easier to work, it often saves shop time and reduces rejects.

The benefits of vacuum melting are especially spectacular in the case of "superalloys" used for high temperature applications such as jet engine blades and rotors. One blade producer found that replacing air-melted with vacuum-melted superalloy increased stress rupture life 40%, ductility 100%, and tensile strength 12%. Best of all, it halved the cost per satisfactory blade!

Vacuum pays for itself outside the aircraft industry, too. Included on the growing list of high performance products benefit-



ting from its use are bearing races, jewelers rolls, bolts, precision castings, valve springs, chemical process equipment, dies, electronic tubes, and watches. Besides improving the strength, composition control, cleanliness, life, corrosion resistance, conductivity, ductility, and workability of existing materials, vacuum melting allows you to develop new alloys which are impossible to produce in conventional furnaces.

If you'd like to know whether vacuum metallurgy can improve your product and cut your costs, let us know. We'll be glad to share the knowledge we've gained from building and operating more high vacuum furnaces than any other organization in the world. If you decide to conduct your own vacuum metallurgical operation, you'll find that NRC is your one convenient source for a complete line of vacuum arc, induction, and resistance furnaces with capacities from a few pounds to several tons. Write today.

**See us at Booth No. 1426 at the
Metals Show Nov. 4-8, Chicago**



NRC

**EQUIPMENT
CORPORATION**

DEPT. 16J, CHARLEMONT ST., NEWTON 61, MASS.
A Subsidiary of National Research Corporation

WHY *Cambridge*

Woven Wire Belts

mean low cost,
continuous heat treating

Baskets and manual handling become things of the past, treatment is more uniform, capacity increases . . . if you eliminate batch operation and combine movement on woven wire conveyor belts with annealing, brazing, quenching, oiling, tempering, sintering. Your products move continuously in a belt-to-belt flow all through the heat treat cycle, process costs drop in all departments. FOR EXAMPLE:

Continuous Quenching

ALL-METAL BELT moves wrenches out of quench tank continuously, dumps and returns for more. Woven wire construction from corrosion-resistant alloy provides lasting strength . . . has no seams, lacers or fasteners to break or wear.

SPECIAL CROSS FLIGHTS pick up parts from tank, hold them on the belt during inclined travel.

OPEN MESH permits rapid drainage of quench solution, quick drying of parts—also provides free circulation of atmosphere in furnace cycles for more uniform annealing and brazing.

OPTIONAL CHAIN DRIVE provides positive motion for heavy loads or inclined movement. Friction drive easily handles most loads.

Cambridge Woven Wire Conveyor Belts are made in any size, mesh or weave, from any metal or alloy, and can be used under a wide range of conditions . . . hot or cold, wet or dry. Call your Cambridge Field Engineer to discuss how you can cut costs with continuous processing on woven wire conveyor belts. Look for his 'phone number under "Belting, Mechanical" in the Yellow Pages or write for FREE 130-PAGE REFERENCE MANUAL.



The Cambridge Wire Cloth Co.

WIRE
CLOTH



METAL
CONVEYOR
BELTS



SPECIAL
METAL
FABRICATIONS

Department A,
Cambridge 9,
Maryland



OFFICES IN PRINCIPAL INDUSTRIAL CITIES

EXHIBITS, MEETINGS

(Continued from P. 13)

Sept. 29-Oct. 3, Broadmoor Hotel, Colorado Springs, Colo. Society headquarters, 2860 E. 130th St., Cleveland 20.

OCTOBER

The Electrochemical Society — Semi-annual meeting, Oct. 6-10, Statler Hotel, Buffalo. Society headquarters, 216 W. 102nd St.

American Institute of Steel Construction — 35th annual meeting, Oct. 6-11, Hotel del Coronado, Calif. Society headquarters, 101 Park Ave., New York.

American Society of Lubrication Engineers—Fourth conference, Oct. 7-9, Royal York Hotel, Toronto, Ont., Canada. Society headquarters, 84 E. Randolph St., Chicago.

Committee on Vacuum Techniques —Fourth annual symposium on high vacuum technology, Oct. 9-11, Hotel Somerset, Boston. Society headquarters, Box 1282, Boston.

Gray Iron Founders' Society, Inc. —Annual meeting, Oct. 9-11, The Drake Hotel, Chicago. Society headquarters, 930 National City-E 6th Bldg., Cleveland.

Conveyor Equipment Manufacturers Assn. — Annual meeting, Oct. 12-15, The Grand Hotel, Point Clear, Ala. Society headquarters, One Thomas Circle, Washington, D. C.

Pressed Metal Institute — Annual meeting, Oct. 13-17, Castle Harbor, Bermuda. Society headquarters, 3673 Lee Rd., Cleveland.

Rail Steel Bar Assn.—Fall meeting, Oct. 14-16, Western Hills Hotel, Fort Worth, Tex. Society headquarters, 38 S. Dearborn St., Chicago.

American Society of Civil Engineers —Annual meeting, Oct. 14-18, Hotel Statler, New York. Society headquarters, 33 W. 39th St., New York.



Delicate appetite for a "Queen" . . .

80 TONS IN ONE BITE!

But look at the size of her! Taller than a 13-story building, and weighing 2,400 tons, this lady is entitled to a queen-size appetite. She's the *River Queen*—largest power shovel ever built by the Bucyrus-Erie Company. And her huge, 80-ton-capacity bucket is made of tough USS "T-1" Steel to keep her eating regularly for a long time. Backed by 15 powerful motors and fronted by a formidable row of ripping teeth, the "Queen's" huge maw scoops up 55 cu. yds. of overburden at a gulp and dumps it nearly 300 feet away from the digging point. Digging and dumping in less than a minute, the *River Queen* could pile up a mountain of more than 100,000 tons of overburden in 24 hours!

This big shovel is being used to uncover two seams of coal for W. G. Duncan & Peabody Coal Companies in western Kentucky. When the mine is in full operation, its output is expected to be 2 million tons of

coal annually. The "Queen" will be highly instrumental in making this possible.

With all the weight and mechanical muscle the big shovel possesses, her dipper has to be a real battering ram. That's why it's made of USS "T-1" constructional alloy steel. Biting and ramming through rock and earth, hour after hour, day after day, is punishing service. USS "T-1" Steel is designed to take this kind of impact, shock and abrasion. And its amazing toughness never falters, even at temperatures far below zero.

The very high yield strength of USS "T-1" Steel—90,000 psi mini-

mum—saved tons of weight in the big dipper, making a bigger payload possible with each scoop. And, speaking of strength, the 86-foot dipper handle and the 145-foot boom are made of another U. S. Steel product, USS Tri-TEN high-strength low-alloy steel.

Perhaps you need a steel that offers high strength, extraordinary toughness, resistance to impact abrasion, or good creep rupture strength combined with ease of fabrication. USS "T-1" Steel is your answer, and we'll gladly help you adapt it to your particular application. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

United States Steel Corporation, Pittsburgh • Columbia Geneva Steel Division, San Francisco
Tennessee Coal & Iron Division, Fairfield, Ala.
United States Steel Supply Division, Warehouse Distributors, Coast To Coast
United States Steel Export Company, New York

USS  CONSTRUCTIONAL ALLOY STEEL

USS, "T-1," and TRI-TEN are registered trademarks.



UNITED STATES STEEL

949 tons of tin product rolled



UNITED STATES STEEL

in 8 hours — on USS Quality Forged Rolls



THE MAN IN THE SMALL PICTURE is Charles D. Kelly, Superintendent of the cold reduction and sheet finishing department at U. S. Steel's giant Fairless Works. He was completing his 20th year when a crew on the 5-stand cold reduction mill rolled out an impressive 949 tons of tin product in a single 8-hour shift.

The mill was equipped with USS Quality Forged and hardened rolls, as might be expected. But you should know that no U. S. Steel mill is obligated to buy rolls from the company if competitive rolls will give better performance. Here is the heart of the story: based on careful long-range performance figures, the USS forged rolls are equal to or better than any other on the market.

As a major steel producer, U. S. Steel has the opportunity to test the quality of its rolls. Even further, U. S. Steel buys rolls from other manufacturers—for an evaluation of our product. Over and over again, records have shown that USS Quality Forged Rolls have improved wear resistance, and a high degree of cleanliness.

When buying most custom-made steel products, the customer specifies the quality, type and chemistry of the steel, as well as heat-treating procedures and other manufacturing methods. Not so with rolls. With the exception of physical dimensions, surface finish and hardness level, rolls are sold strictly on the basis of performance. Do you keep a careful record of your roll performance? If you do, you may well find yourself ordering USS Quality Forging rolls *all* the time.

Please address inquiries or requests for our free 32-page Forging booklet to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

USS QUALITY FORGINGS

heavy machinery parts... carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types



**To meet rugged service conditions—
a refractory concrete dome
made with
ATLAS LUMNITE* CEMENT**



Three-year service life was obtained at this plant by a previous furnace dome made with the same materials. This 17' diameter hardening and annealing furnace inner dome is made with a castable refractory containing Atlas Lumnite cement — A. P. Green "Kast-Set." Heat passes through 289 easily formed 5" round holes, heating concrete on both sides. Installed by Lindberg Combustion, Chicago, Ill., for the Englander Co., Inc., Birmingham, Ala.

- Lumnite-made refractory concrete resists extreme variations in temperature and thermal shock due to rapid heating and cooling.
- Durability under severe operating conditions is assured.
- Placement is fast and easy — service strength is reached within 24 hours.

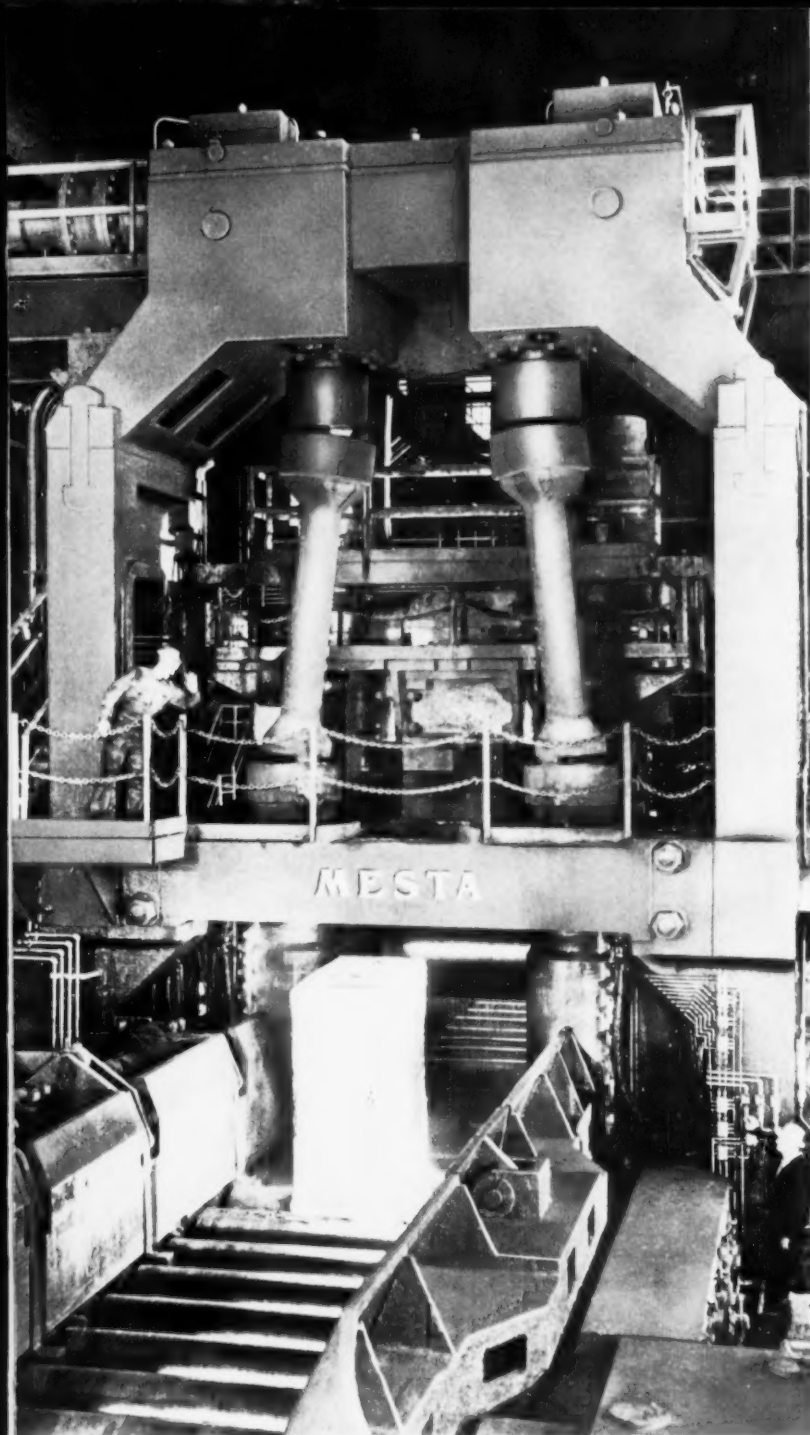
For maximum convenience, use Lumnite-made castables. These are pre-mixed, ready for use, and are made by leading manufacturers of refractories. For more information, write: Universal Atlas, 100 Park Avenue, New York 17, N. Y.

* "LUMNITE" is the registered trademark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.



UNIVERSAL ATLAS CEMENT COMPANY — member of the industrial family that serves the nation — **UNITED STATES STEEL**

OFFICES: Albany • Birmingham • Boston • Chicago • Dayton • Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • St. Louis • Waco



Experienced
engineering and
development

KEY TO HIGHER TONNAGE

...with
Westinghouse-equipped
reversing mills

Knocking down an ingot on schedule places heavy demands on your primary reversing mill. Drives and auxiliary equipment take rough abuse. To give you an edge in meeting demands, Westinghouse drives are engineered from long experience. New advances in Westinghouse automatic controls and coordinated auxiliary equipment keep your mill on schedule.

MP-3051

YOU CAN BE SURE...IF IT'S Westinghouse



Dependability is tailor made

Experience tailors each drive

Today, reversing mill drive equipment takes heavier abuse than ever before. Growing operating and tonnage requirements can't be met by yesterday's set of standards. That's why experienced engineering at Westinghouse tailors each drive to the specific mill. In this way, you can be sure of top performance, maximum accessibility to all parts of the drive, and rugged construction quality for reliability today and long into the future.

The Westinghouse reversing mill drive, at right, is a good example. Main drive is a 12,000 hp., 40 80 rpm double-armature twin motor. Edger drive (top) is a 4,000 hp., 60 150 rpm double-armature motor. Time-saving accessibility is provided by: 1) large walk-in endbells, 2) extra space for brush accessibility, both radially and axially, and 3) absence of baffle restrictions between the commutator area and the stator or rotor windings.

Heavy-duty thrust bearings are located at the mill end of the main drive pedestal bearings to permit easy, routine inspections. Removable end-case permits complete inspection and maintenance without disturbing either journal bearing or bearing cap.

Rugged construction of the Westinghouse reversing mill drive incorporates heavy-duty bedplates supported on concrete foundations. Pedestal cap bolts and base bolts extend deep into foundation concrete. Mill-end bearings are supported by massive pedestals using foundation keys. Each armature coil is rigidly and individually braced, front and rear. Armature coil cross connections are securely encased in a steel box at the rear of the rotor and flexibly connected to armature coils.

Oscillotrol (R) thrust oil-damper system effectively damps out rotor oscillations caused by pulses from mill-spindle coupling action on twin-drive motors.

MP-3051

YOU CAN BE SURE...IF IT'S **Westinghouse**



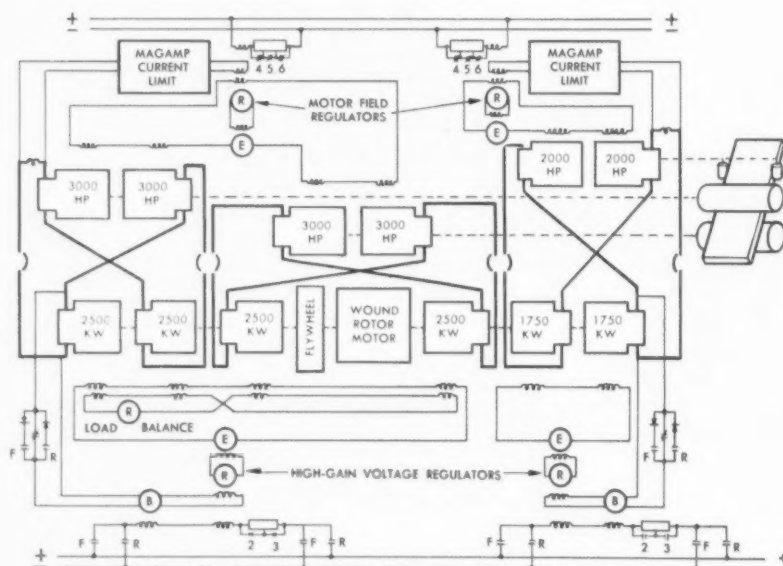
SYSTEM FEATURES

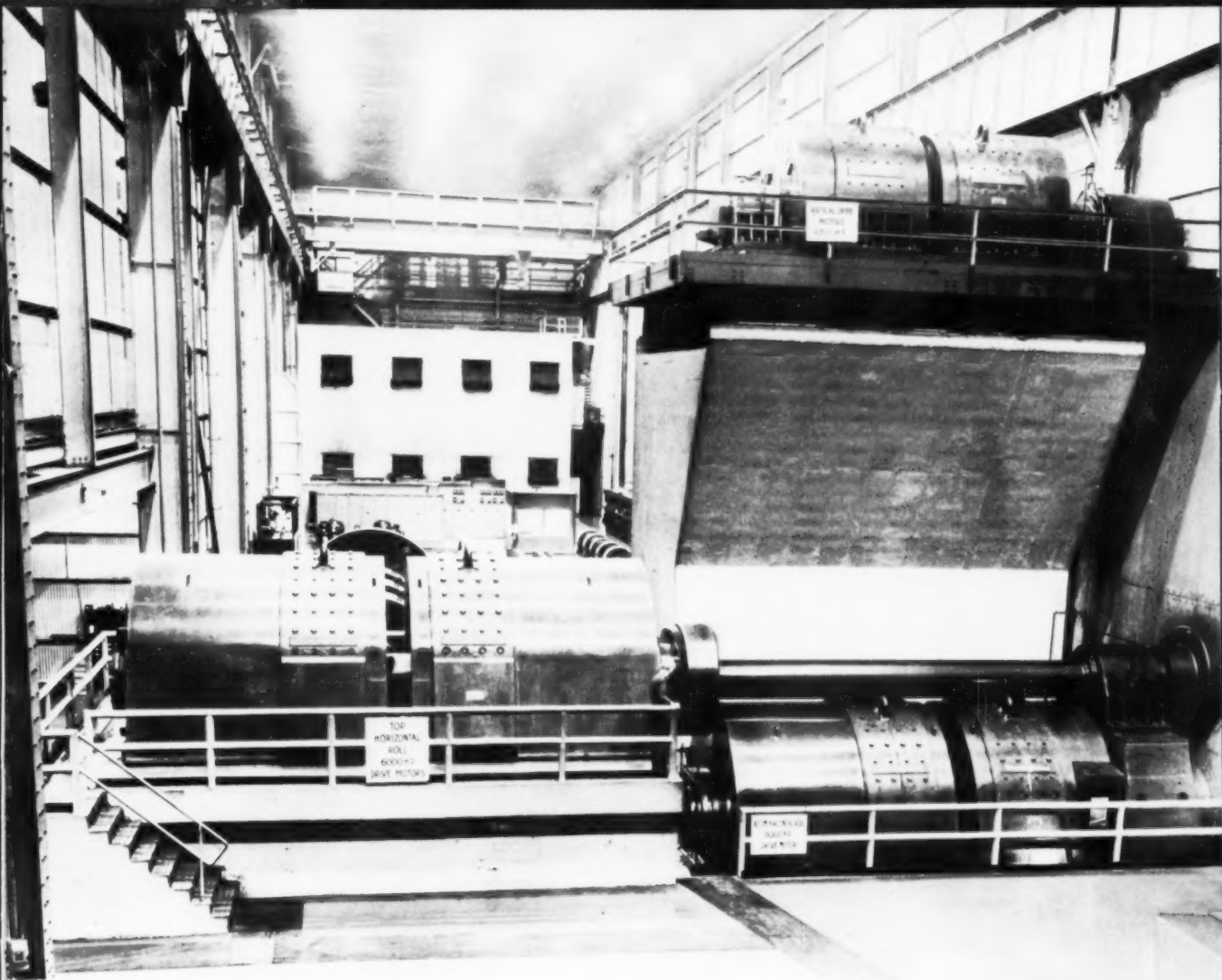
Sandwich series loops are used for each of the pairs of double-armature twin-drive motors and for the double-armature edger motor to minimize the number of circuit breakers and load balance equipment. A load balance regulator excites auxiliary field on the 2500 kw generators to balance the twin-drive motor loads.

High-gain voltage regulators excite generators to give fast changes in response to the operator's controls.

Motor field regulators excite motors to give changes in speed by motor-field control.

MAGAMP (R) magnetic amplifier current-limit regulator builds up motor field strength to increase the torque per ampere for loads approaching 200%.





Typical reversing mill drive using 12,000 hp, 40-80 rpm double-armature twin motor.
Edger drive (top) is 4,000 hp, 60-150 rpm double-armature motor.

WESTINGHOUSE EQUIPMENT SERVES THESE USERS

YEAR	CUSTOMER	LOCATION	MILL	HP	RPM
1951	U. S. Steel Corporation	Fairless Hills, Pa.	40" Blooming Mill	8000*	65/130
1951	Sheffield Steel Division	Kansas City, Mo.	32" Blooming Mill	4000	60/150
1951	Laclede Steel Company	Alton, Illinois	35" Blooming Mill	5000	60/150
1951	Dow Chemical Company	Madison, Illinois	84" Reversing Mill	6000	55/156
1951	U. S. Steel Corporation	Morrisville, Pa.	Universal Slabbing Mill	12000*†	40/80
1951	Great Lakes Steel Corporation	Detroit, Michigan	Universal Slabbing Mill	12000*†	40/80
1953	Reynolds Metals Company	McCook, Illinois	144" Taper Mill	3000	125/250
1954	Inland Steel Company	Indiana Harbor, Ill.	Wide Flange Beam Mill	7000†	80/160
1955	Aluminum Co. of America	Davenport, Iowa	160" Slabbing Mill	7000*	30/60
1955	Empresa Nacional Siderurgica	Spain	132" Plate Mill	7000*	40/80
1955	Jones & Laughlin Steel Corp.	Cleveland, Ohio	Slabbing Mill	10000*	40/100
1955	Kaiser Al. & Chem. Corp.	Ravenswood, W. Va.	168" Slabbing Mill	10000*†	30/60
1955	Kaiser Al. & Chem. Corp.	Ravenswood, W. Va.	110" Slabbing Mill	6000	30/60
1955	Republic Steel Corp.	Cleveland, Ohio	Universal Slabbing Mill	12000*	40/80
1955	Jones & Laughlin Steel Corp.	Aliquippa, Pa.	Reversing Rougher	6000*	40/100
1955	Jones & Laughlin Steel Corp.	Cleveland, Ohio	Reversing Rougher	8000*	40/80
1955	Crucible Steel Co. of America	Midland, Pa.	Roughing Mill	3500	50/150
1955	Armco Steel Corporation	Butler, Pa.	Reversing Rougher	7000	40/100
1956	U. S. Steel Corporation	South Chicago, Illinois	Blooming Mill	12000*†	40/80
1956	U. S. Steel Corporation	Gary, Indiana	Universal Slabbing Mill	12000*†	40/80
1956	Altos Hornos	Mexico	Blooming Mill	6000*	40/80
1956	Large Eastern Steel Company		Blooming Mill	3000	60/150
1956	Reynolds Metals Company	Listerhill, Alabama	170" Slabbing Mill	7000*	30/60
1956	Tata Iron & Steel	India	Reversing Rougher	3500*	60/150
1956	Kaiser Steel Company	Fontana, California	90" Slabbing Mill	10000*	40/100
1956	Olin Mathieson Chem. Corp.	Omni, Ohio	96" Slabbing Mill	5000	35/70
1956	Empire Steel Corporation	Mansfield, Ohio	Reversing Rougher	5000	50/120

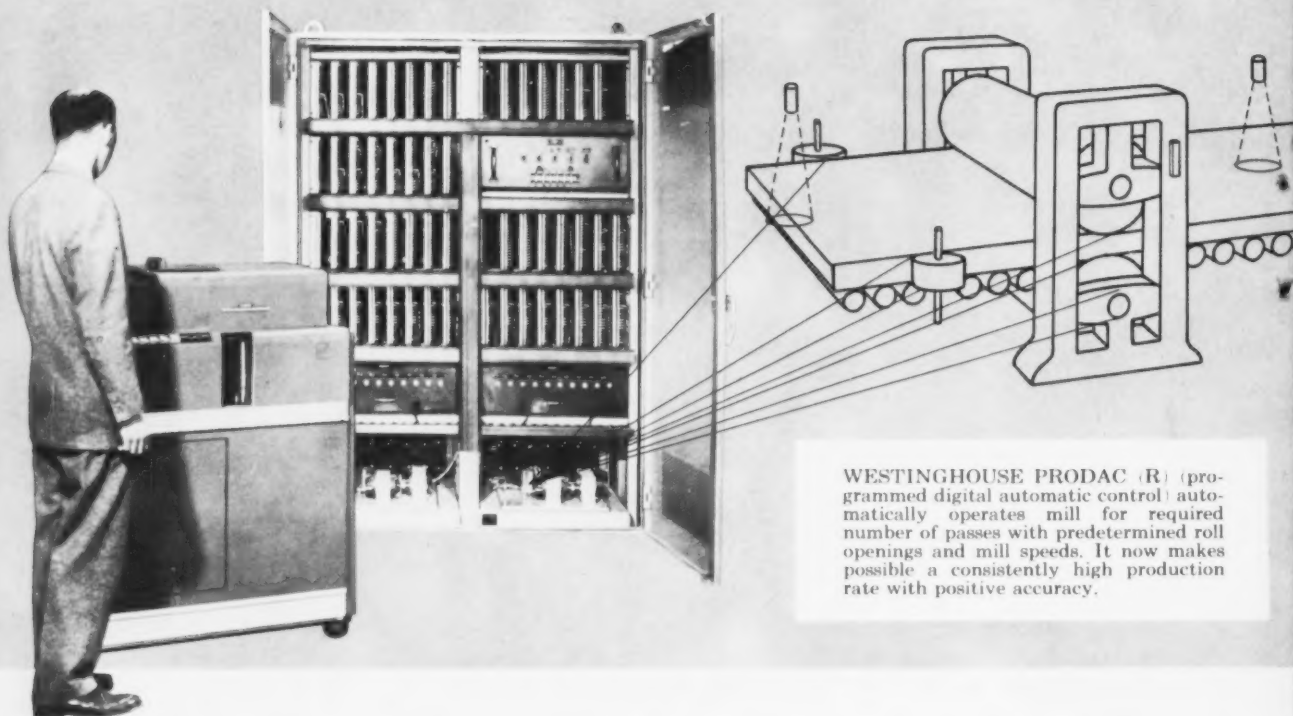
*Armco Steel Corp.

†Division of National Steel Corp.

*Twin Drive

†Double Armature

Auxiliary equipment
takes over more
responsibility



WESTINGHOUSE PRODAC (R) (programmed digital automatic control) automatically operates mill for required number of passes with predetermined roll openings and mill speeds. It now makes possible a consistently high production rate with positive accuracy.

Reversing mills are more precise, automatic with Westinghouse auxiliaries

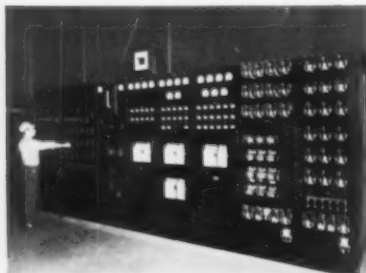
Continued research and development by Westinghouse helps to make your operations more precise and automatic. A recent example is PRODAC control. It makes possible the first completely automatic mill with card-programmed rolling information.

Unmatched Westinghouse engineering for high-tonnage reversing mill operation is at your service

... from planning to design, installation and start-up. A skilled Westinghouse team will accept unit responsibility and work with you and your consulting engineers.

Contact your Westinghouse sales office for further details... Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pa.

MP-3051



WESTINGHOUSE main-drive control panels provide centralized start-up switches for fans and motor-generator sets, and metering for power and regulating circuits.



WESTINGHOUSE variable voltage control for all auxiliaries minimizes handling time. Transfer switches and emergency bus arrangement afford relief in case of generator failure.



MCT600 INDIVIDUAL TABLE ROLL MOTOR, silicone insulated; drives mill tables directly; in ratings at 230 volts; frame sizes from 604 to 618; 3.75 hp to 50 hp, 157 rpm to 85 rpm.

YOU CAN BE **SURE**...IF IT'S Westinghouse





Production per disc increased over six times:

1. By change to disc with new



2. By special use of large single-point diamond dresser

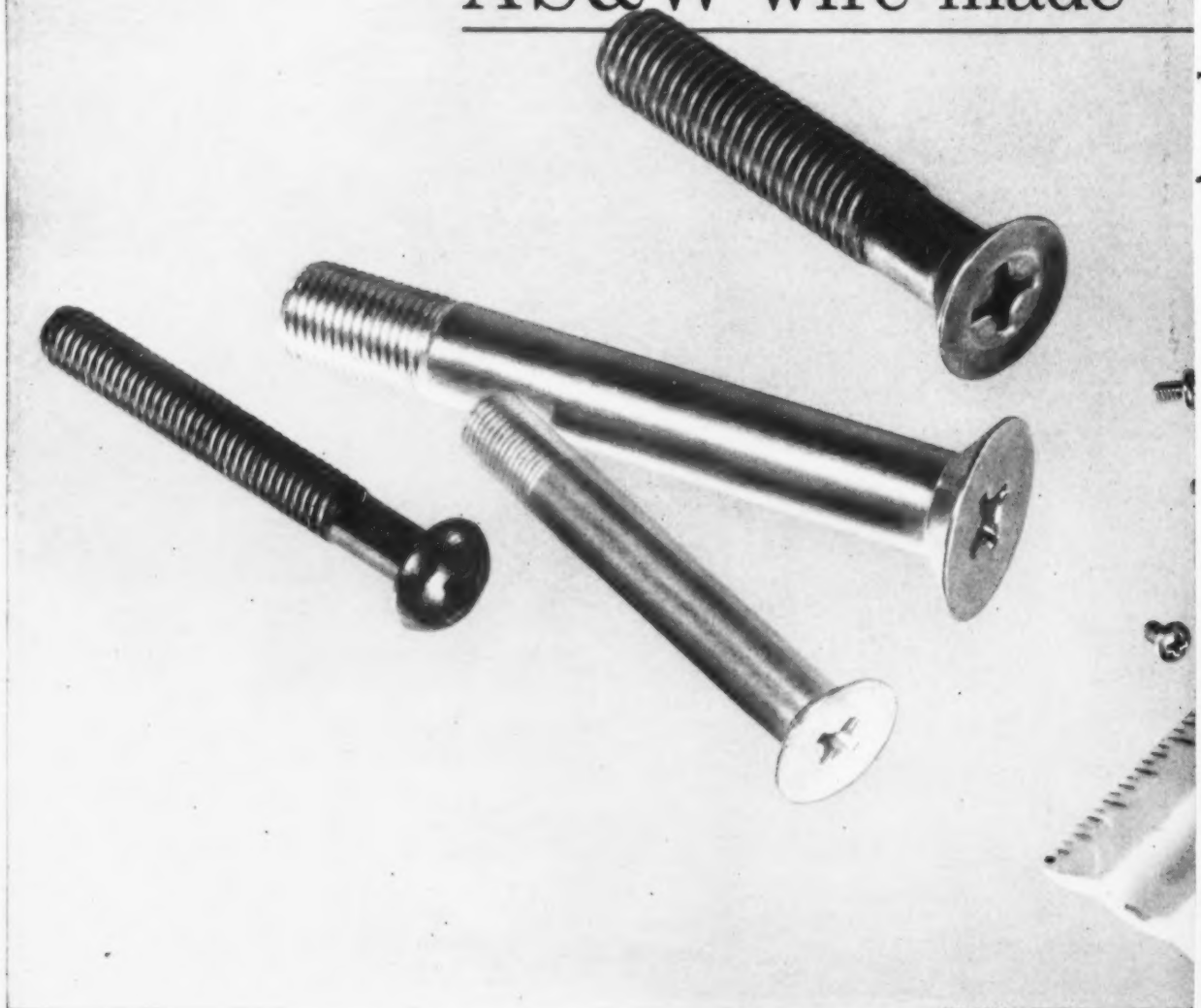


Grinding both ends and bottom of cast iron transmission cases. Machine is Gardner 179-72" Horizontal Disc Grinder.

... Another example where Gardner's combined knowledge of both machines and abrasives paid off profitably. Call the Gardner Man for a practical, economical solution to your flat surfacing problem.

GARDNER
abrasive discs
BELOIT, WISCONSIN

"AS&W wire made



Some typical Phillips head fasteners. Notice the well-defined Phillips punch impression, made with one blow in cold steel.

Typical bank of cold-heading machines. Impression of the Phillips punch is such a severe operation that punches may last from one to several hours.



Phillips fasteners possible,"

says AMERICAN SCREW COMPANY
WILLIMANTIC, CONN.

AMERICAN SCREW COMPANY is the largest manufacturer of recessed head fasteners. They produce several million pieces a day, in thousands of different varieties, using many tons of highest quality cold-heading wire.

We're all familiar with the Phillips head fastener. Consider for a moment the production problems involved in making it. In a high-speed, two-blow, cold-heading machine, the wire is cut and cold forged into a blank in the first operation. Then,

in the second step, the preformed head is impressed with the Phillips punch. The wire must be hard enough not to buckle; but at the same time, it must be soft enough to flow and fill out the head without splitting—even when the Phillips punch slams into it.

For years, we worked to develop a wire that would withstand the relentless pounding of the Phillips cold-heading machines. We developed a highly engineered method of annealing the wire, then drawing it slightly to work-harden it. It was hard on the outside (no buckling), soft on the inside (easy flowing), clean as a whistle and free from surface imperfections.

We would be tempted to say that this was strictly an American Steel & Wire development . . . but it wasn't. Factually, the development of "Phillips Quality Wire" was a cooperative effort between the men at AS&W and American Screw. It took a long time, but it paid off with beneficial results that have radiated to every industry that has a fastening problem.

There is nothing we'd like better than a chance to cooperate with you to help work out some of *your* wire problems. Just call your AS&W salesman.

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO,
PACIFIC COAST DISTRIBUTORS • TENNESSEE COAL & IRON DIVISION,
FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Checking a coil of AS&W "Phillips Quality Wire."
All wire is bought to finished size. It is shipped coated, ready for heading.

USS AMERICAN MANUFACTURERS WIRE



AMERFINE —high-quality fine wire.
AMERSPRING —music steel spring wire.
AMERTEMP —heavy-duty oil-tempered wire.
AMER-LED —lead steel.

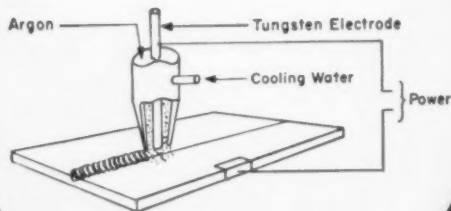
AMERLOY —alloy heading wire.
AMERHEAD —uniform heading wire.
AMERSTITCH —extra-tough metal stitching wire.
STAINLESS STEEL —wire and strip.

UNITED STATES STEEL

For any of your welding jobs

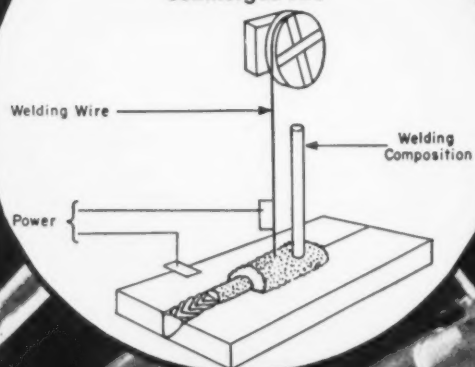
HELIARC

Inert Gas Shielded Arc



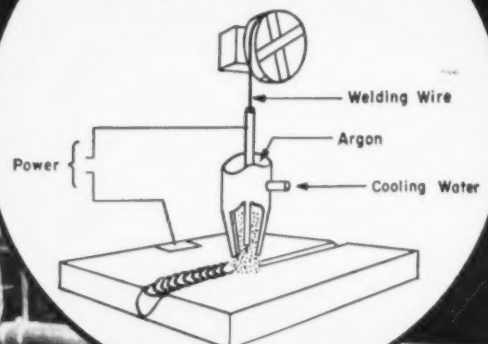
UNIONMELT

Submerged Arc



Sigma

Shielded Inert Gas Metal Arc



FOR THE BEST IN ELECTRIC WELDING... LOOK TO LINDE

... LINDE can supply the *right method!*

Inert gas shielded arc welding—

HELIARC Apparatus for inert gas shielded arc welding, using a tungsten electrode and a shield of LINDE argon, is tops for joining hard-to-weld commercial metals. On stainless steel and aluminum, HELIARC Welding is fast and clean, producing high-quality welds that resist corrosion. HELIARC Welding eliminates costly grinding and finishing, making it a valuable method for quantity production of hard-to-weld metals.

Submerged arc welding—

Shapes made of materials ranging from light gage to heavy plate, adaptable to mechanization, can be most economically joined by UNIONMELT Welding. It is used on low and medium carbon steels and alloy steels, including those containing chrome and/or nickel. UNIONMELT Welding is also used extensively for resurfacing metal, providing extra wear and corrosion resistance. UNIONMELT Welding is fast and inexpensive on production jobs.

Shielded inert gas metal arc welding—

One of the most versatile welding methods is Sigma Welding. LINDE's Sigma apparatus, using a shield of LINDE argon, is ideal for manual welding of commercial metals $\frac{1}{8}$ in. or more thick, and for automatic operation on lighter gage metals to .050 in. Highest quality welds can be made on aluminum thicker than $\frac{1}{8}$ in. at speeds up to 16 inches per minute. Build-up and surfacing jobs are also improved by using LINDE's Sigma welding method.

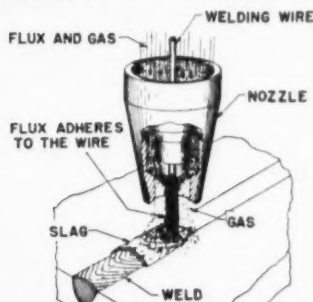
New! **Magnetic flux gas shielded arc welding—**

UNIONARC Welding, LINDE's most recent development in electric welding, is an extremely fast method for welding mild steel. This method employs a continuously-fed, bare steel wire electrode, magnetically coated with flux conveyed in a stream of carbon dioxide shielding gas. Manual welds can be made easily in any position—vertical, overhead, downhand—with no stops to change electrodes. The speed, versatility, and ease of operation of UNIONARC Welding brings costs down 25% to 65% below those of manual covered electrode welding. Clean, smooth, high-quality welds are provided, even in the presence of moderate amounts of rust, scale, and moisture.

Engineers at LINDE have been designing, developing, and testing electric welding methods and apparatus for many years. Help on any welding method is yours for the asking. You can improve your work and cut production problems by taking advantage of LINDE's experience. For data on UNIONARC Welding or any other electric welding method, call the LINDE office nearest you.

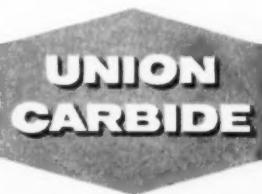
LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. Offices in other principal cities. In Canada: Linde Company, Division of Union Carbide Canada Limited.

UNIONARC Magnetic Flux Gas Shielded Arc



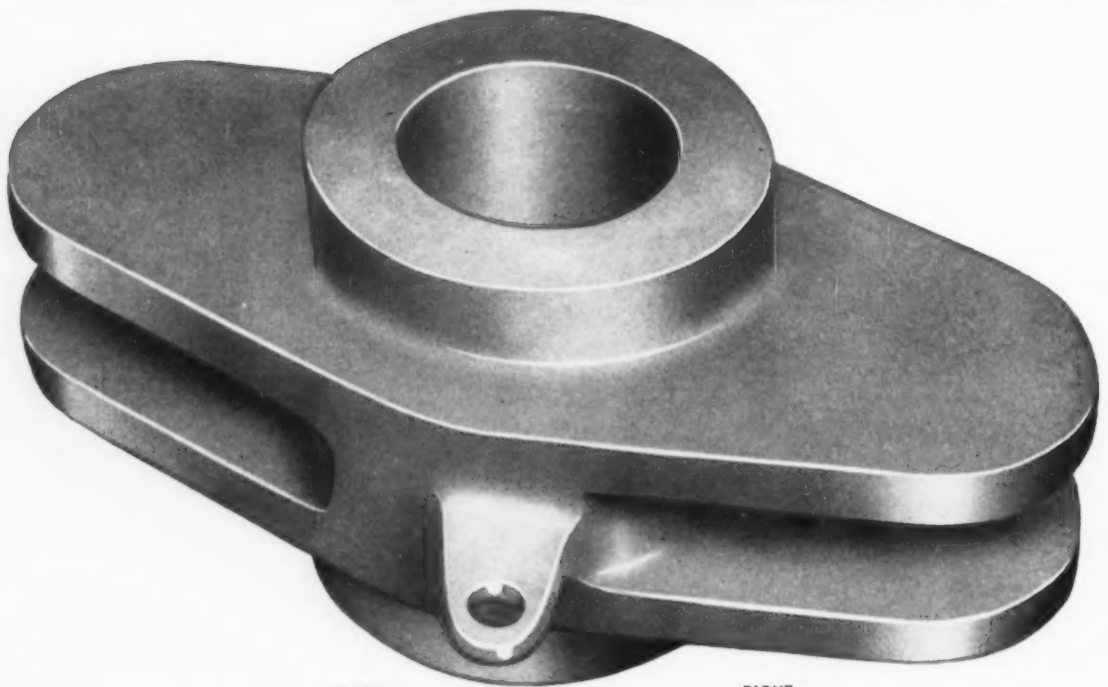
The terms "LINDE," "HELIARC," "UNIONMELT," "UNIONARC," and "UNION CARBIDE" are trade marks of Union Carbide Corporation.

Linde
TRADE-MARK



BEFORE YOU SAY . . .

"IT CAN'T BE CAST"



ABOVE:

Automatic Winch brake pawl carrier.

Previous cast weldment required costly machining. ESCO Shellcasting eliminated major machining and effected considerable savings.

RIGHT:

Transmission Shifter Fork.

As formerly cast the fork tip pads posed difficult alignment problems during machining. ESCO Shellcast made possible the casting of the fork tip pads to size and in alignment, eliminated machining, reduced the unit price.



CALL AN ESCO ENGINEER

ESCO alloy steel castings can make your designing easier. You get the part you want, in the alloy you need and in the shape that saves you the most fabricating, machining and finishing time.

PLUS METALLURGICAL ENGINEERING AND RESEARCH

ESCO maintains one of the largest and best equipped metallurgical staffs of any alloy steel foundry —

PLUS PRODUCT ENGINEERING AND DESIGN

An integrated service at all levels; in the field, at the drawing board and in the foundry —

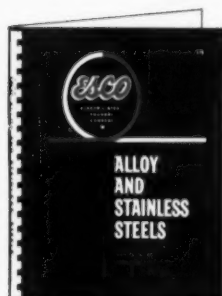
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ESCO laboratory technicians are qualified and equipped to perform all types of inspections and testing to the most rigid specifications.

Call an ESCO Engineer—let him show you how ESCO Alloy Steel Castings make your designing easier.



Write today for your FREE copy of this informative 100-page reference book, "ESCO Alloy and Stainless Steels for the Process and Manufacturing Industries"



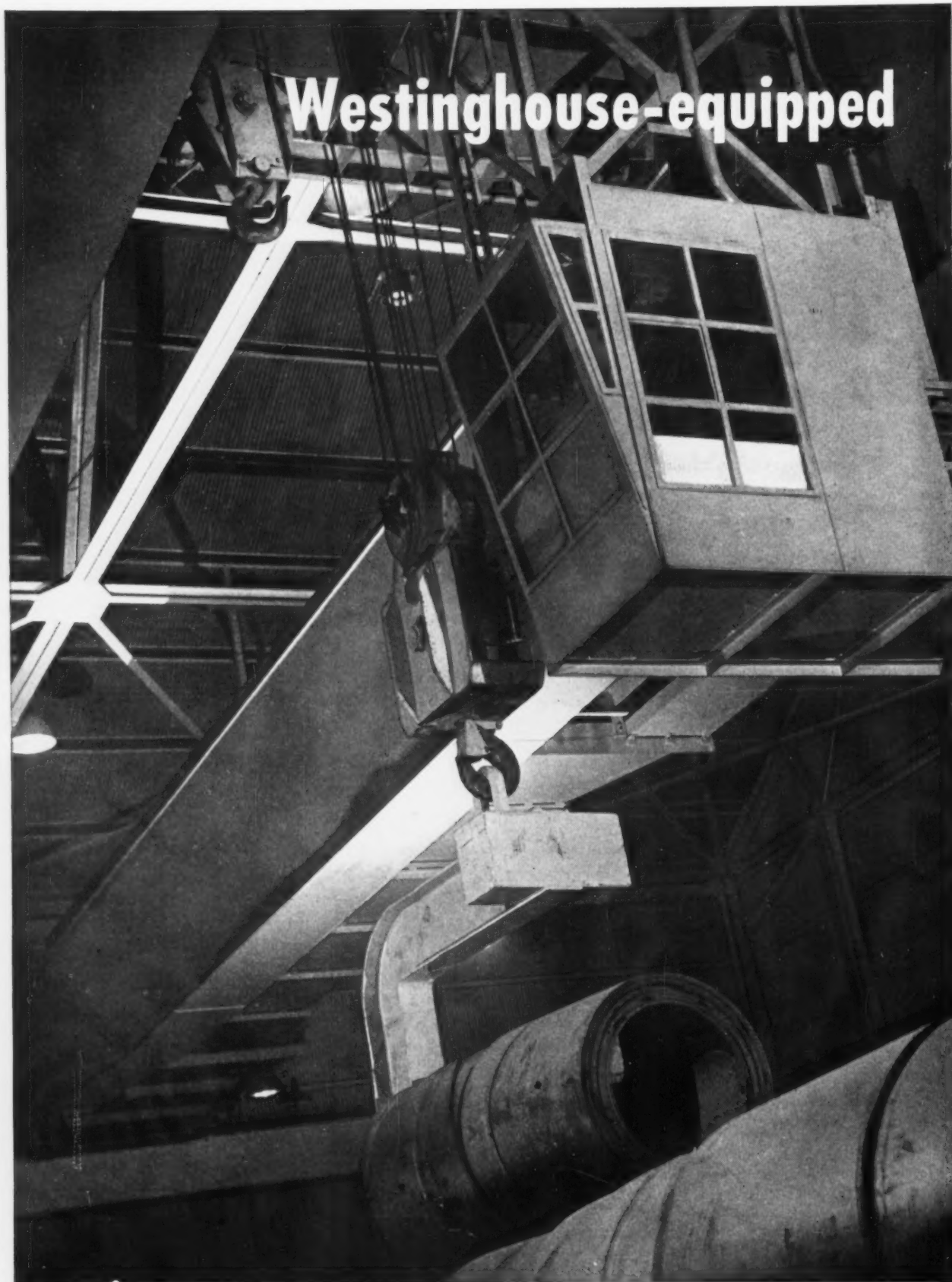
ELECTRIC STEEL FOUNDRY COMPANY

2184 N. W. 25TH AVE. • PORTLAND 10, OREGON

MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.

Offices in Most Principal Cities

ESCO INTERNATIONAL, NEW YORK, N. Y.
IN CANADA ESCO LIMITED





20-ton

crane built to work 60 minutes every hour

moving skelp loads at
Jones & Laughlin's modern new tube mill

Outfitted with a C-hook, this new Movable Bridge Crane handles 9,250-pound coils of welded tube skelp, two at a time, in almost constant duty. Westinghouse silicone-insulated mill motors, fast-acting crane control and brakes are fully coordinated to give this unit the rugged stamina and positioning accuracy for continuous handling of big loads.

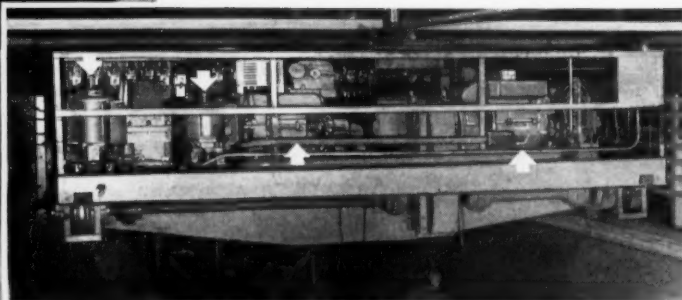
The low-inertia armature of the 600 Type MC mill motor assures quick response. Outstanding hoist control features an armature shunt point for light hook speed, *plus* an anti-cycling relay to prevent pumping in or out of the limit switch zone. Exclusive Westinghouse self-adjusting d-c magnetic brakes are used to assure positive braking when handling heavy loads. Westinghouse years of experience and engineering leadership have developed the industry's finest and most complete line of motors and controls for heavy-duty mill crane and hoist applications.

For all the facts, call your local Westinghouse sales engineer or write Westinghouse Electric Corporation, P. O. Box 868, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

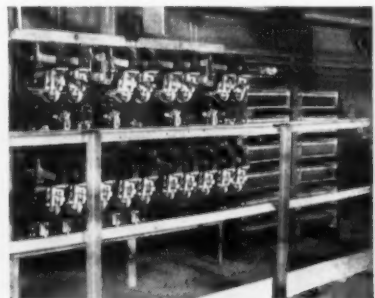
J-22029

YOU CAN BE SURE... IF IT'S

Westinghouse



Crane is equipped with Westinghouse d-c mill motors to power bridge and trolley as well as the 20-ton main hoist and auxiliary 5-ton hook. Westinghouse SA brakes are completely self-adjusting—no adjustment or maintenance is ever necessary with wear.



Westinghouse Type M d-c contactors and AZ relays assure millions of trouble-free make-breaks for dependable service in continuous steel mill duty. Self-cleaning, knife-edge bearings guard against dust and dirt.

TWO MORE* ALL

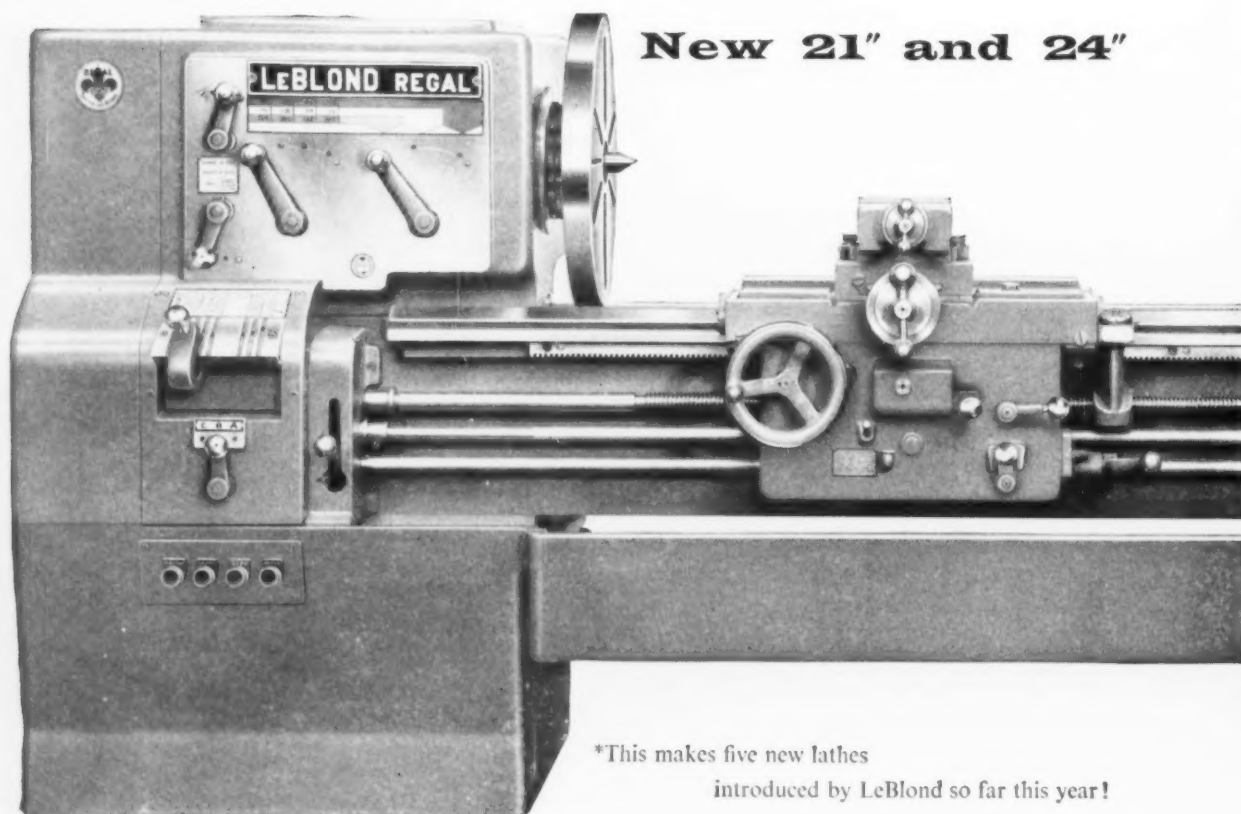
The new 21" and 24" LeBlond Regals give you capacity, speeds and horsepower you'd find in more expensive heavy type machines offered by other builders—and at one of the most attractive prices LeBlond has ever offered!

Here's the rundown. Standard 7½ HP, optional 10 HP for high speed ranges in both models (see chart); electric clutch and brake; feed reverse at the apron; heat-treated gears in head, quick-change box and

apron—plus all the famous big-lathe features that have made LeBlond Regals production favorites from coast to coast.

Headstock uses the same combination gear-belt drive construction that proved itself on the famous LeBlond Dual-Drive and is now incorporated on our new 16" heavy-duty lathe. Bed has hardened and ground replaceable steel ways like the ways on our larger machines. They are fitted according to the compensating

TWO MORE* ALL



New 21" and 24"

*This makes five new lathes
introduced by LeBlond so far this year!

NEW L⁺E BLONDS

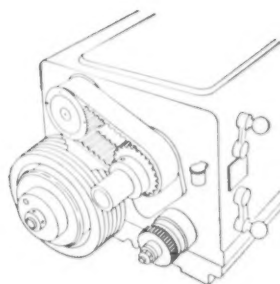
veeway principle to insure better distribution of forces for proven long-time accuracy and minimum wear.

Again, like higher-priced lathes, Regals are equipped with both feed rod and preloaded precision leadscrew for continued accuracy in thread chasing. Other big-lathe features—3 bearing spindle. Automatically-lubricated quick-change box. Wide carriage bridge with ample bearing surface. Rugged tailstock with plug clamping. In addition, you get general dimen-

sions and construction details patterned after LeBlond heavy-duty engine lathes.

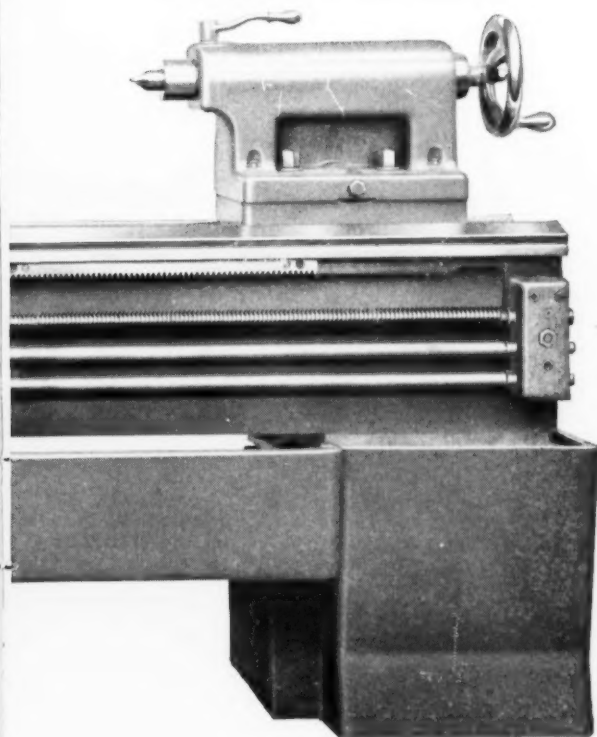
All of LeBlond's 70 years of experience has gone into the design and building of these new Regals. Only from the builder of a complete line of lathes can you get a low-priced lathe with all these big-lathe features. Get full details on the new 21" and 24" LeBlond Regal Lathes. See your LeBlond Distributor or write—Ask for Bulletin R-205C.

NEW L⁺E BLONDS



Exclusive LeBlond
Combination Gear-Belt Drive

Regal lathes deliver up to 10 H.P.!



STANDARD AND OPTIONAL SPEED RANGES
21" and 24" REGALS

12 Standard Speeds:

Gear Drive	18, 25, 35, 49, 70, 98, 136, 192 rpm.
Belt Drive	260, 362, 510, 720 rpm.

12 Optional Speeds:

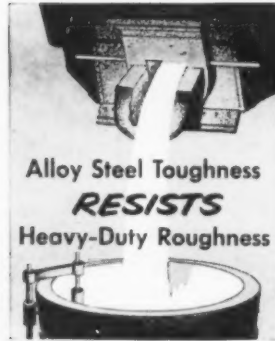
Gear Drive	27, 38, 53, 74, 105, 146, 204, 288 rpm.
Belt Drive	390, 544, 765, 1080 rpm.

... cut with confidence

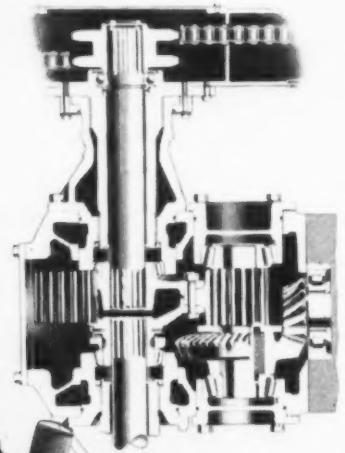
THE R. K. LEBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio



*World's Largest Builder of A Complete Line of Lathes for
More Than 70 Years*



DRIVE AXLE



Model "660" Motor Grader
is built by Adams Division,
LeTourneau-Westinghouse
Company, Indianapolis, Ind.



REPUBLIC



World's Widest Range of Standard Steels

DESIGNED FROM ALLOY STEEL

Shrugs Off Fatigue, Terrific Torque, High Impact Load

Motor graders built by Adams Division of LeTourneau-Westinghouse Company are known throughout the world for quality and dependability.

A good example of the company's constant effort to improve this quality and dependability can be found in the grader's full-floating, two-section drive axle—considered to be the most vulnerable part in the entire unit. It is subjected to terrific torque from an eight-speed, constant-mesh transmission. Impact load is often extreme.

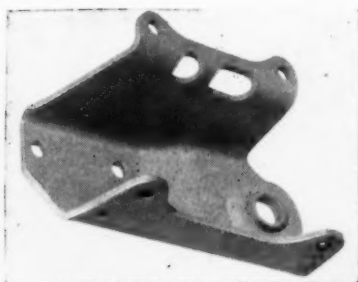
Company engineers and metallurgists spent thousands of hours on research and field testing of all types of steels to find one that would reduce ultimate fatigue in the axle to an absolute minimum.

They eventually settled on Republic Hot Rolled 4340 Alloy Steel. This fine steel not only resists

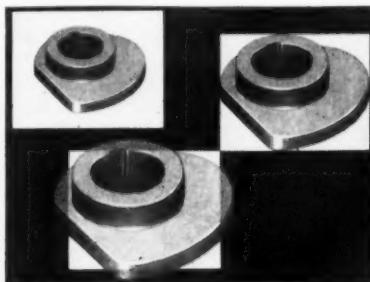
fatigue, but also is able to take a high torque without a permanent set. Fatigue failure is now practically non-existent.

Alloy steels provide an outstanding combination of qualities essential to designing smaller sections to move or carry heavier loads with no sacrifice of strength or safety. They resist fatigue, shock and stress. Respond uniformly to heat treatment, producing hard, wear-resistant surfaces around tough cores. This tough, integral structure provides greater strength with minimum weight.

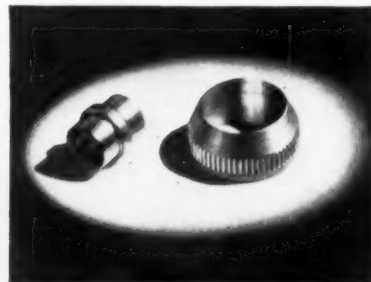
Specify Republic Alloy Steels for your jobs where strength and toughness must resist heavy-duty roughness. We offer you the services of our experienced field metallurgists to help you get the most from these versatile steels at the lowest possible cost. There's no obligation. Just mail the coupon.



COMPLETE DESIGN, engineering and fabricating facilities go to work for you as an extension of your plant when you have your stamped and drawn parts fabricated by Republic's Pressed Steel Division. This truck shaft bracket is one example of a wide variety of steel parts mass produced to specification at the lowest possible cost. Send coupon for Booklet Adv. 681.



DIE AND PART DESIGN PROBLEMS are reduced by 3 new grades of Republic Iron Powder with *Controlled Dimensional Factor*. In the presence of copper, these powders—depending on type—can be made to grow, remain stable, or shrink, within acceptable limits. Complete information on Type "G" for growth, Type "N" for normal, Type "S" for shrinkage are contained in Booklet Adv. 763. Write for it.



DESIGN FLEXIBILITY PLUS HIGH STRENGTH are secured by Flodur, Inc., Cleveland, Ohio, through use of Republic Cold Drawn Leaded Alloy Steel for these hydraulic fitting parts. Compared with non-leaded alloy, machining speeds were increased 200%, with negligible scrap loss. Also, a fine finish and excellent tool life are secured, plus the strength needed to withstand high-compression loads. Send coupon for facts.

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and Steel Products

REPUBLIC STEEL CORPORATION

DEPT. C-2829A

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☐ Have an Alloy Steel Metallurgist call.

Send more information on:

☐ Stampings (Booklet Adv. 681) ☐ Iron Powder
☐ Cold Finished Leaded Steel Bars (Booklet Adv. 763)

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

WANT MORE POWER, MORE SPEEDS?



NEW HEADSTOCK GEAR TRAIN—sixteen different spindle speeds available, powered by up to 30 h.p. single-speed driving motor delivering full power at all speeds. Spindle is mounted on selected pre-loaded, precision-tapered roller bearings. Heavier, more rugged design provides smoother, quieter power.

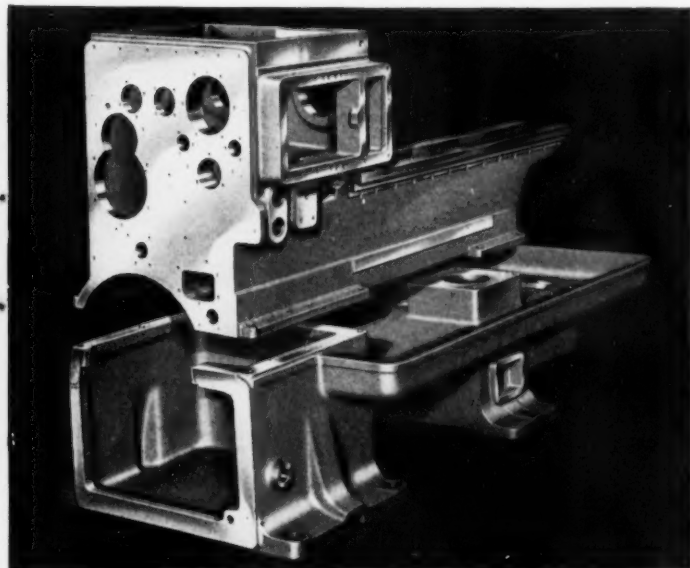


HYDRAULIC SPEED SELECTOR—smooth, effortless speed changes. No waiting, no computing, no stopping of spindle, no releasing of main drive clutch. Operates direct or pre-set. Hi-Lo Lever permits instantaneous speed changes in 8:1 ratio without moving Speed Selector handwheel. Multiple Disc Clutches have automatic take-up for wear.

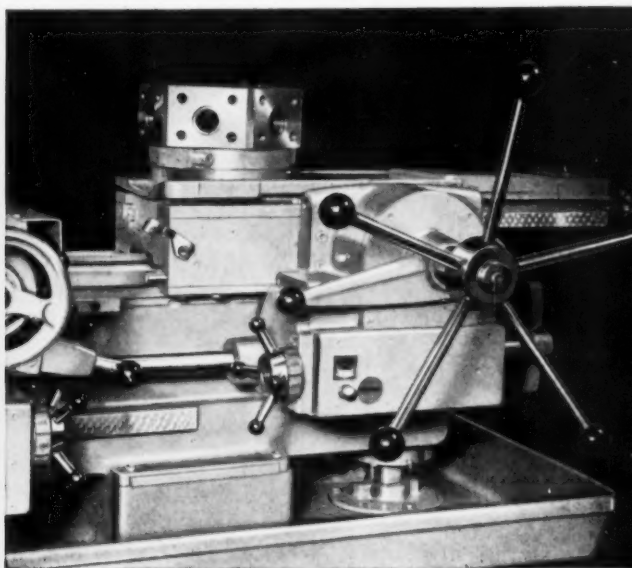
YOU GET THEM ALL...PLUS NEW GISHOLT MASTERLINE



WANT HEAVY CUTS WITHOUT VIBRATION?



NEW HEADSTOCK AND BED CASTING—scientific design dampens out vibrations, assures smooth operation and simplifies holding closer tolerances. Made from semi-steel, poured in Gisholt's own foundry. Greater swing over ways permits bigger chucks and broader range of workpiece sizes. Provides a solid foundation for all types of work.



NEW TURRET RAM AND SADDLE—designed wider, heavier, more rigid to handle increased capacity and higher speeds. Dial-type feed selector makes feed changes faster, easier. Turret ram rigidly supported on 64-66 Rockwell C alloy steel way strips. Power transmitted through serrated tooth clutches, with shear pin protection against overloading.

GREATER VERSATILITY...WITH THE RAM TYPE TURRET LATHE

YOU'LL SPEED UP your production jobs—both large and small—with this more powerful, more versatile Gisholt MASTERLINE Ram Type Turret Lathe.

Here is a machine designed from end-to-end for easier setups, faster change-over and higher productive output than ever before. Check the advanced features illustrated above. Note the reserve power to handle your heaviest cuts—and to meet your tooling requirements of tomorrow. Note the extra spindle speeds—all at your operator's finger tips, without computing—for faster, better turning of

any type material. And look over the new massive design, the over-all ruggedness that permits greater accuracy, closer tolerances, deeper cuts at punishing feeds without vibration.

Find out now how this powerful, flexible Gisholt MASTERLINE Ram Type Turret Lathe can reduce floor-to-floor time on your specific jobs. Call your Gisholt Representative today—let him show you how this advanced machine can fit most profitably into your production picture. Or write direct to Gisholt for the new literature described below.

READY NOW—all-new, 18-page illustrated Bulletin No. 1174-B, covering features, accessories, tools and floor plans on new Gisholt MASTERLINE Ram Type Turret Lathes. Ask for it!



GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

They're both right

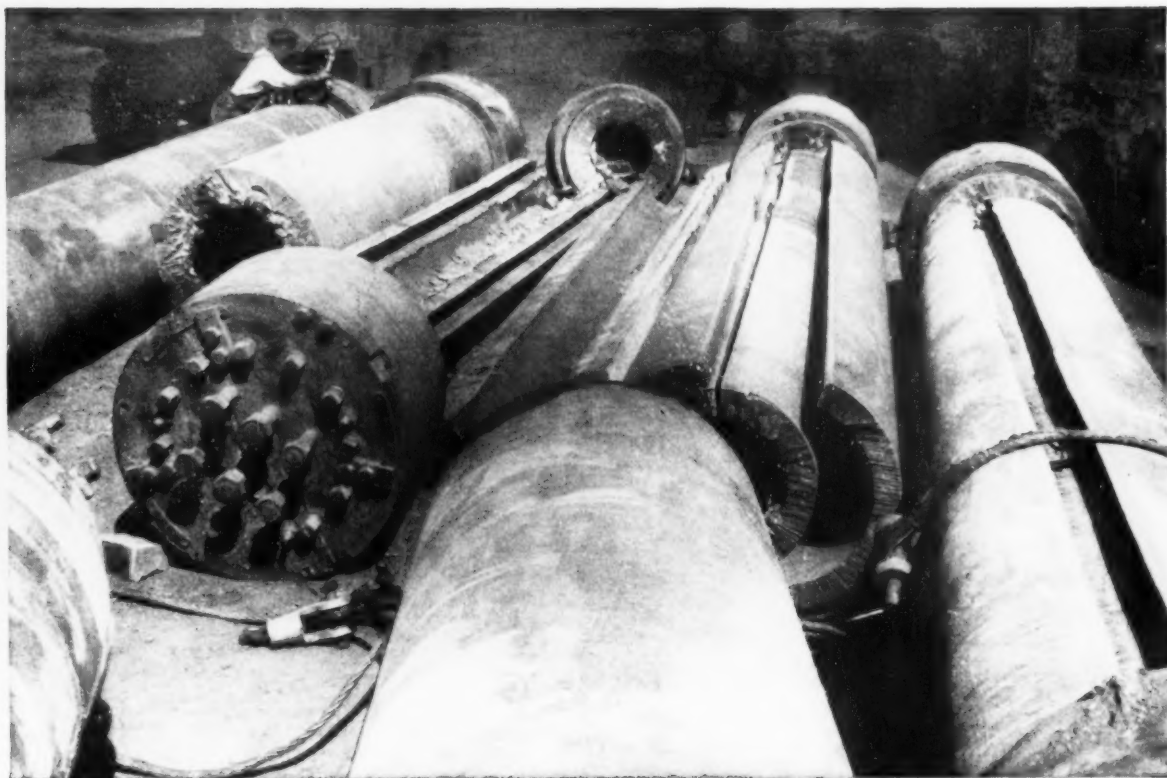


Man on the left claims that Tru-Steel does the best cleaning job at lowest cost. Fellow on the right swears by Malleabrasive. But they're both right! Tru-Steel is best on some jobs... Malleabrasive is best on others. Different jobs may call for different abrasives but the result should always be the same—the best job at lowest cost per ton of castings cleaned. Whichever you need, Pangborn has the right abrasive for your job. Our sales engineers are experts on abrasives. Ask the one in your area for his advice or write PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Maryland. Manufacturers of Blast Cleaning and Dust Control Equipment.

Easy to handle
Easy to stack



Pangborn FOR
MALLEABRASIVE®
AND **TRU-STEEL SHOT**



Mechanized Cutting Speeds Scrapping of 95-Ton Pressure Vessels



Scrapping huge pressure vessels loomed as a costly, time-consuming job for a large scrapyard in Birmingham, Alabama. But mechanized oxygen-cutting quickly cut this job down to size—and with substantial savings in labor and materials.

The versatile OXWELD CM-45 Portable Cutting Machine teamed up with a C-56 Blowpipe to slice through 8-in. thick laminated steel walls at a speed of 4 to 5 in. per minute. Two 24-ft. cuts were made in each vessel in less than two hours' time. Transverse cuts were then made to reduce these sections to charging-box size.

Today scrapyards, fabricators, and maintenance shops everywhere are slashing costs with the speed and efficiency of mechanized oxygen-cutting.

See how you, too, can save. Ask your nearby LINDE representative to show you the *complete* line of dependable OXWELD Portable Cutting Machines—or write for free catalog F-4487. Do it today!

LINDE COMPANY

DIVISION OF

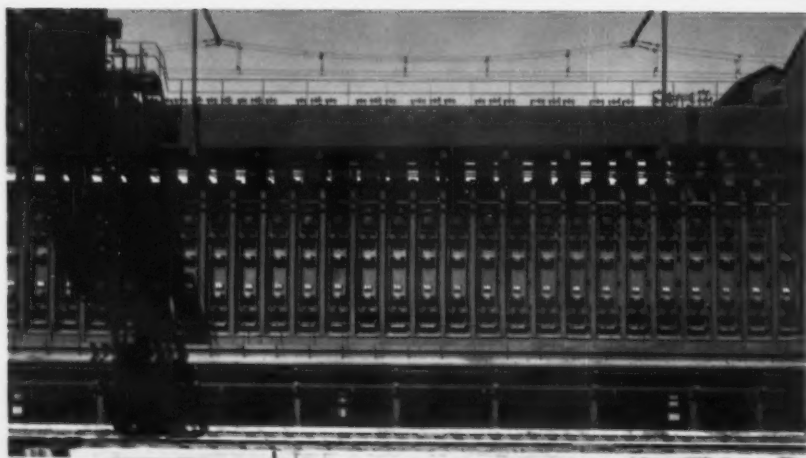
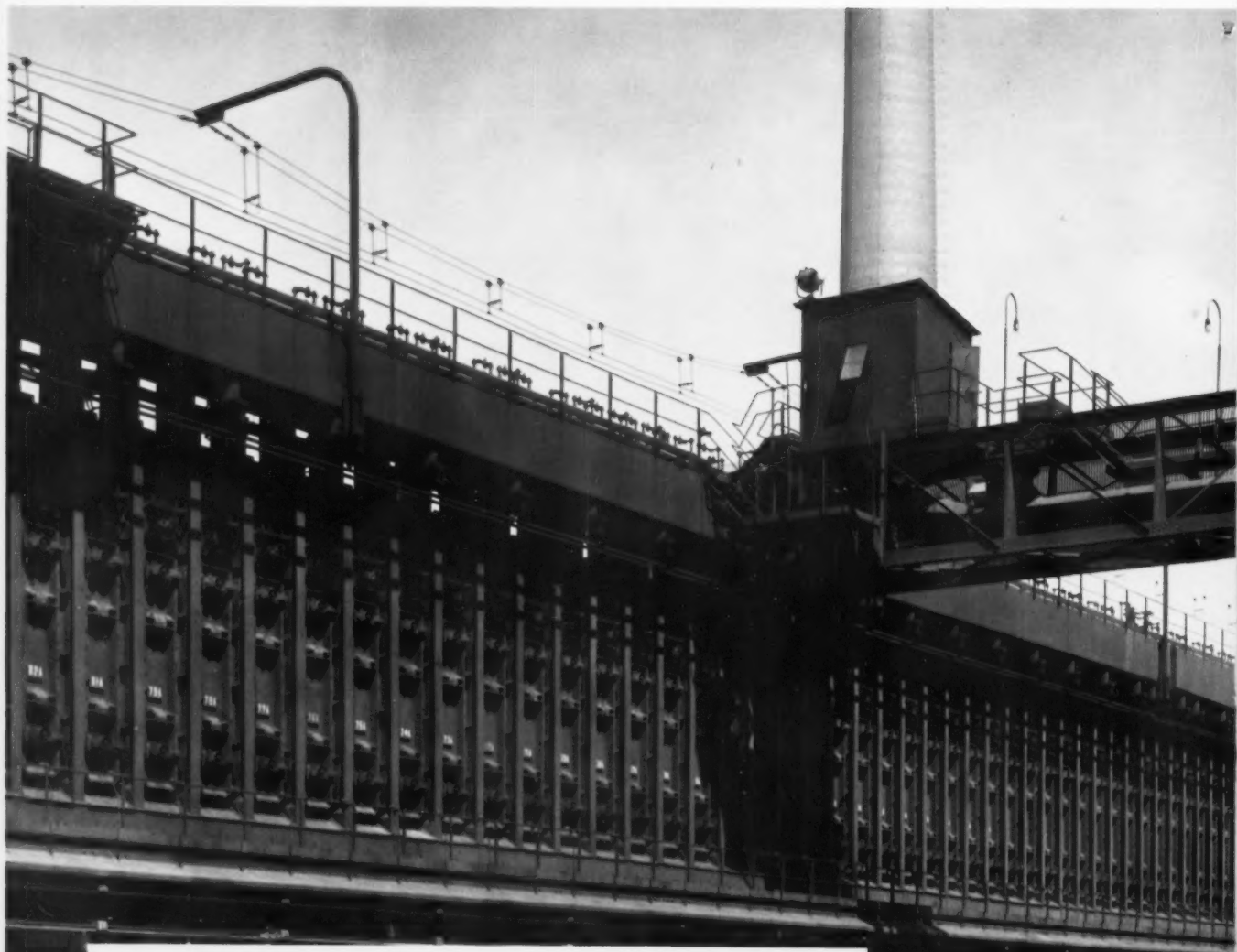


CORPORATION

30 East 42nd Street, New York 17, N. Y.

"Linde," "Oxweld," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Repeat order for Koppers Youngstown Sheet & Tube



Battery No. 4—is shown in these photos of the Coke Plant at Youngstown Sheet & Tube's Indiana Harbor Works.

Coke Ovens at the Company

Dependable service from existing battery leads to purchase of 75 more Koppers Ovens

BATTERY NO. 3, consisting of 75 Koppers-Becker Underjet Coke Ovens, was put into operation in 1952 at the Indiana Harbor Works. In 1955, Youngstown required additional coke-making facilities, and chose Koppers to design and construct a new battery, which is a duplicate of Battery No. 3.

2,000 net tons per day

The new Koppers battery went into operation late in 1956. Its 75 ovens carbonize approximately 2,000 net tons of coal per day. Oven walls feature Koppers patented and highly regarded Hammerhead construction. Recirculation of waste gas insures uniform heating, cuts down fuel consumption, and eliminates any need for decarbonizing equipment—an important saving.

Coke oven or blast furnace gas

Now underfired with coke oven gas, the new battery can later be fired with blast furnace gas if desired. This construction, which permits both types of gas to be used, was first developed and introduced by Koppers.

Koppers accustomed to repeat business

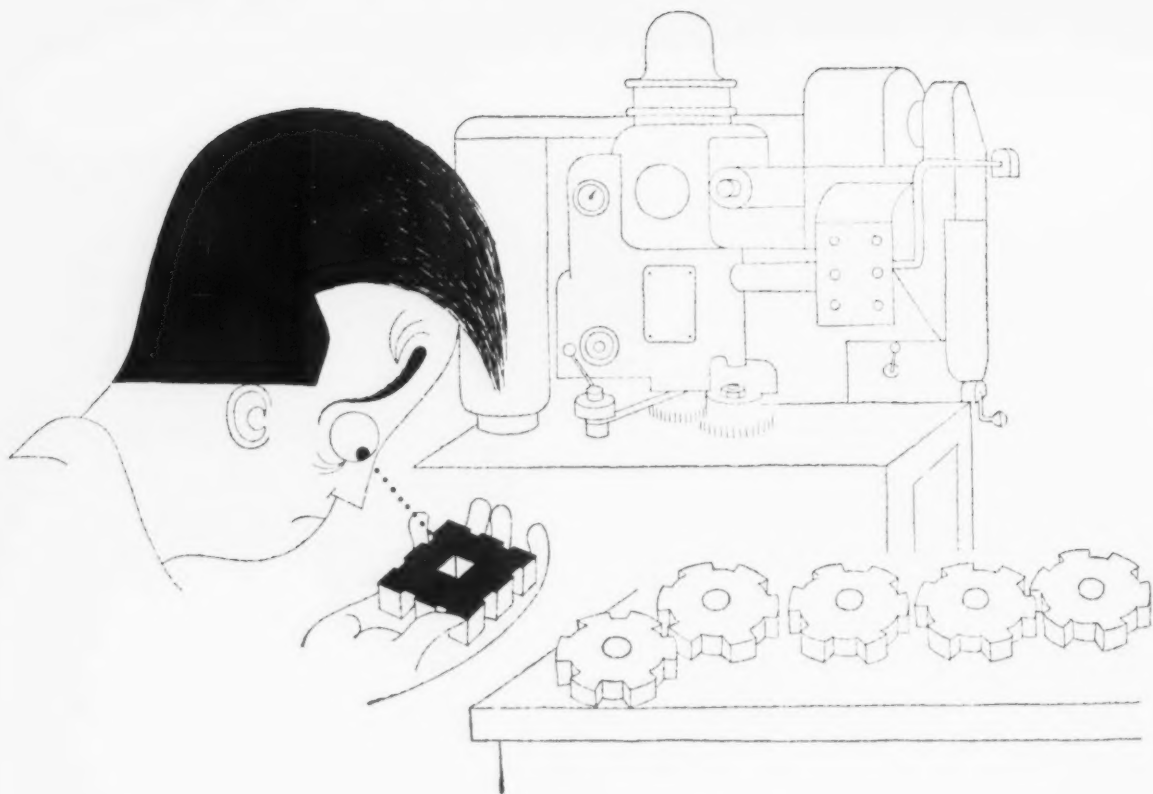
Koppers has built the majority of coke ovens in the United States. Much of this business, like the new battery for Youngstown Sheet & Tube, is *repeat* business—the kind you get only if your product has given satisfactory service.

We think this is a good reason for you to specify Koppers—not only for coke ovens, but for all other steel-plant installations. Koppers brings you 50 years of service and experience. The Coke Plant, Freyn, and Chemical Departments have done work on nearly all types of steel-making equipment. Write or call for information. Koppers Company, Inc., Engineering and Construction Division, Pittsburgh 19, Pennsylvania.



KOPPERS

ENGINEERING AND CONSTRUCTION



Got a machining problem?

You may need **MAX-EL 3½**—a high quality, free-machining, deep-hardening alloy steel promptly available from Crucible warehouse stocks.

THE PROBLEM: Your maintenance shop frequently gets machining jobs, but not enough of them to justify the cost of heat-treating equipment. Still, you're losing money on steels that are hard to machine. So you call your Crucible warehouse—

THEY RECOMMEND: Max-el 3½ Alloy Steel, which can be readily machined (even into intricate parts) without final heat treatment. This steel has already been stress-relieved and heat-treated at the mill which also minimizes the possibility of distortion. And its deep-hardening characteristics give you the strength, toughness and hardness you need for parts such as gears, axles, pinions, shafts and spindles.

High quality, free machining Max-el 3½ Alloy Steel is only one of the dozens of special purpose steels stocked at local Crucible warehouses. Remember: Crucible is the only specialty steel producer *fully integrated to the point of use*. This means control and responsibility from raw material to warehouse delivery to you.

STOCKS MAINTAINED OF:

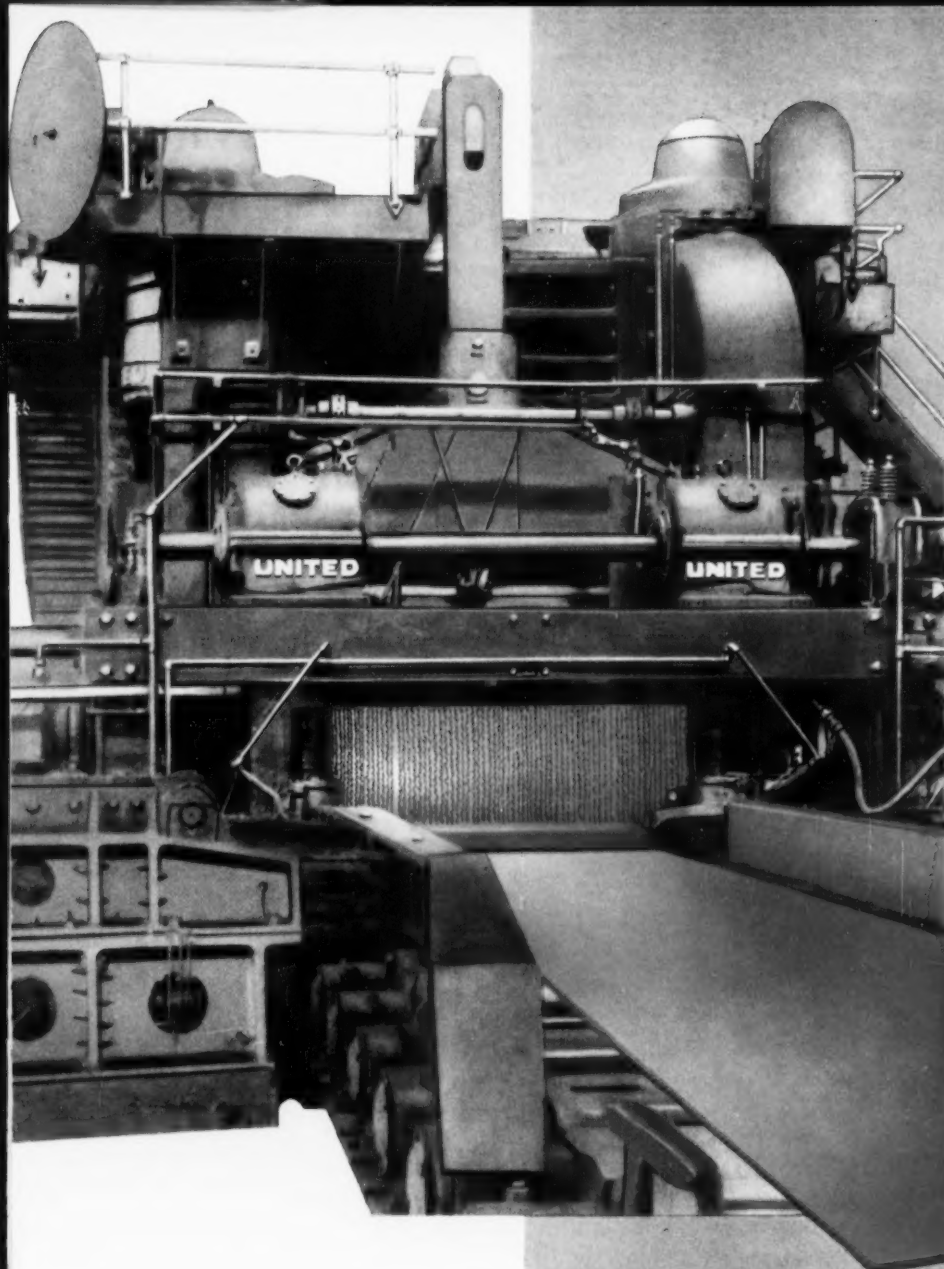
Rex High Speed Steel . . .
ALL grades of Tool Steel
(including Die Casting Die
and Plastic Mold Steel,
Drill Rod, Tool Bits, and
Hollow Tool Steel Bars)
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Bars, Wire, Billets, Elec-
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UNITED®

120 inch Plate Mill



UNITED

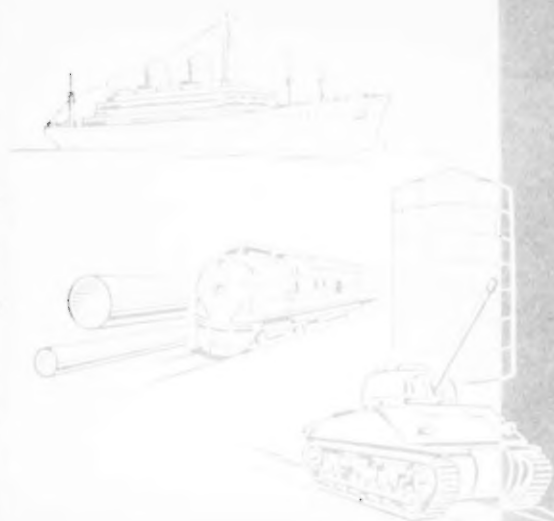
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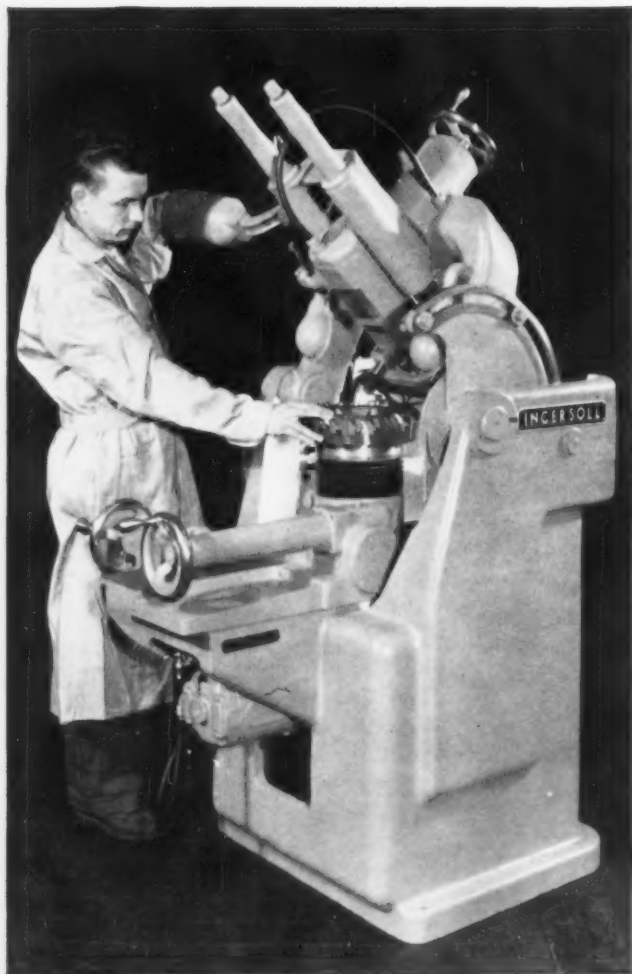
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Designers and builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

UNITED can serve you no matter where in the world you are.



***want to check
your
cutter grinding
costs?***



The Ingersoll Cutter Grinder is Standard Equipment for
Low Cost Sharpening of Inserted Blade Cutters.

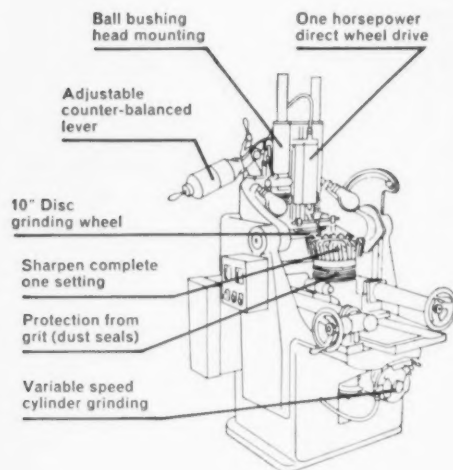
Let us resharpen one of your typical inserted blade cutters. This free demonstration, on a new Ingersoll Cutter Grinder, will tell you what you can expect to save, by replacing standard tool grinders or Ingersoll grinders of obsolete design with new Ingersoll machines.

Accurately ground cutters assure time and dollar savings, longer tool life, better tool and machine performance.

Write for shipping instructions—for a Grinding Cost Check-up.

**Ingersoll Cutter Grinder—for a money
saving investment of about \$5,000⁰⁰
(with normal accessories)**

4" to 30" Diameter Cutters. Accuracy is assured. Grinds both periphery and face in one setting. Simple and easy to operate. Faster than Universal Grinders. Grinds a constant clearance.



This 48-page book includes valuable grinding practice "do's and don'ts". Send for your copy today.

CUTTER DIVISION
THE INGERSOLL MILLING MACHINE COMPANY
ROCKFORD ILLINOIS

◀ BRAINARD ▶

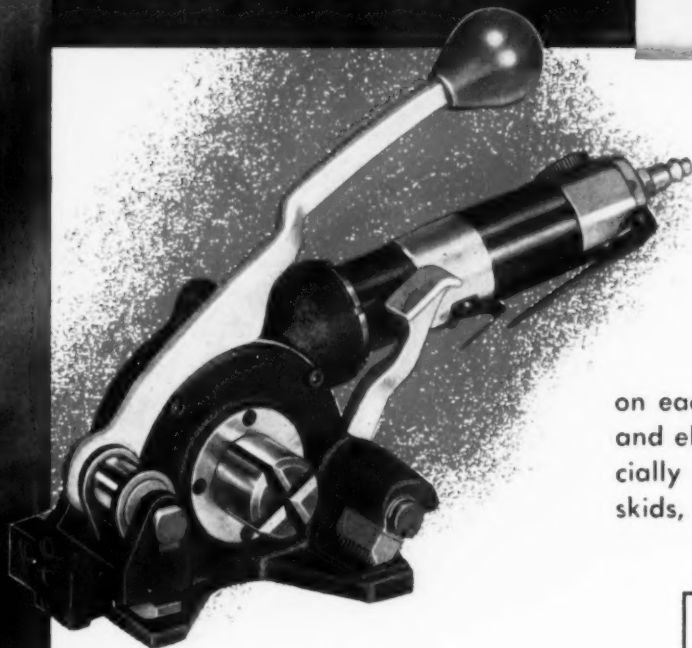
HEAVY DUTY STRAPPING

INTEGRATED PRODUCTION... ... Assures Constant Supply

As a division of Sharon Steel, Brainard's integrated production insures a constant supply of Heavy Duty Strapping in all heavy duty sizes and gauges:

1 1/4" by .035, 3/4" by .035, 2" by .050, 1 1/4" by .050, and 3/4" by .028.

and that's not all...



NEW PNC HEAVY DUTY TOOL

Pneumatic Heavy Duty Strapping Tool, first of its kind. Rugged, light weight, and portable, this power tool insures uniform tension on each band. Power does the work and eliminates operator fatigue. Specially designed for use on pallets, skids, and sheet steel.

Brainard Steel Strapping

SHARON STEEL

Brainard Steel Division, Sharon Steel Corporation
Griswold Street, Warren, Ohio

BRAINARD STEEL STRAPPING DIVISION
WARREN OHIO

I would like more information about
Brainard's Heavy Duty Strapping and
the PNC.

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COMPANY _____

ADDRESS _____

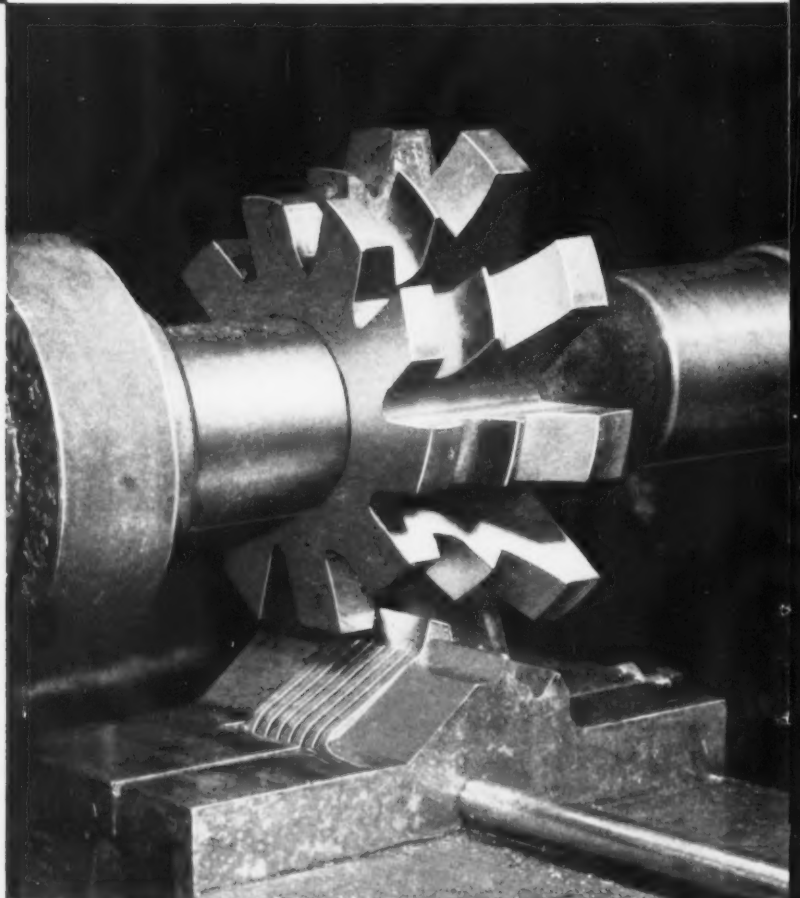
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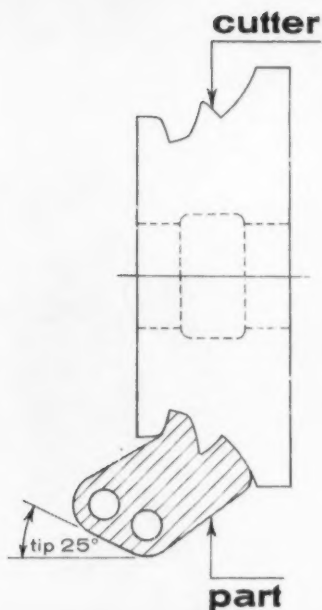
*top cutter design
saves 50% in cutter cost,
reduces cutter breakage*

**BARBER-
COLMAN**
recommends:

a single solid form relieved cutter to
replace two former cutters

improved design to increase tool life
and reduce cutter breakage





This Barber-Colman unground form-relieved milling cutter takes the place of two milling cutters formerly operated as a gang for milling these lever sectors. The proportions of the cutter were improved by reducing the cutter diameter and increasing the bore diameter. These improved proportions provide greater rigidity in the cutter and in the milling operation. As a result, initial cutter cost has been reduced 50%, and cutter cost-per-piece further reduced through extended tool life and reduced breakage.

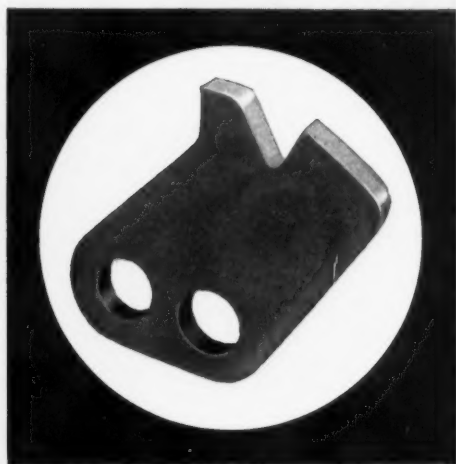
The form on the workpiece is located with respect to the cutter axis to allow sufficient clearance behind all cutting edges. In this particular application, the workpiece is positioned at 25° relative to the cutter axis, permitting the manufacture of a one-piece cutter with adequate cutting clearance.

The material in the part is soft steel of maximum machineability. For best cutting efficiency, the cutter was designed with adequate clearance for milling this material. Cutters are 5" diameter with 1 1/4" bore as compared with previous cutters of 6" diameter and 1" bore.

Replacement with a single form relieved cutter has simplified cutter resharpening and reduced cost-per-piece. All Barber-Colman form relieved cutters are index sharpened across the face of the teeth. Cutters are simply and easily resharpened on conventional equipment or Barber-Colman automatic hob and cutter sharpening machines.

With Barber-Colman improved cutter design, pieces are milled at the rate of 3 1/2" per minute feed, and 150 R.P.M. cutter speed. Tool life averages 3,000 pieces per sharpening.

If you are seeking ways to improve your milling cutter efficiency, consult Barber-Colman cutter engineers. Their skill and experience in applying advance cutter design features will help to solve your milling problems.

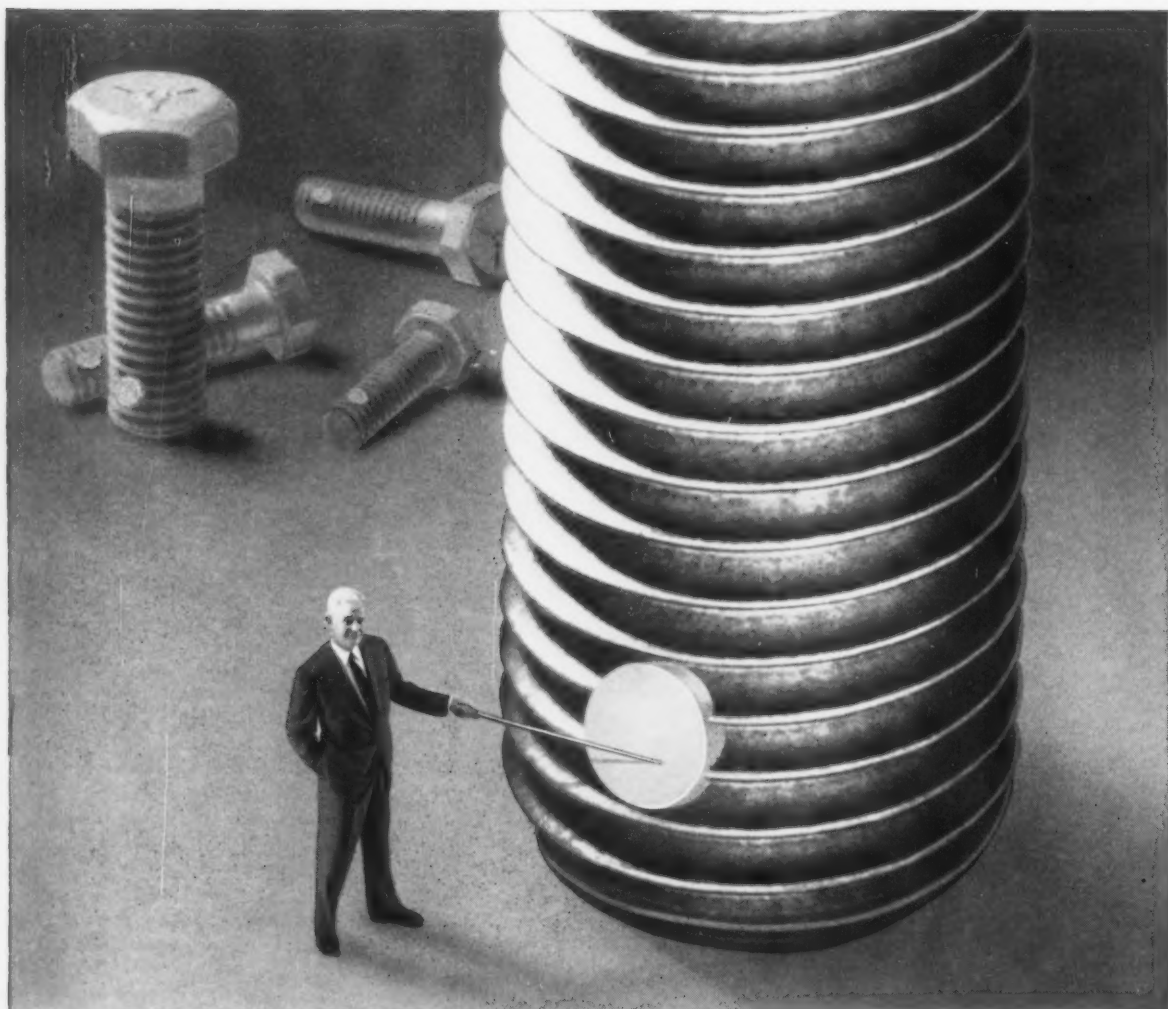


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Hobs • Cutters • Reamers • Hobbing Machines • Hob Sharpening Machines





Cleveland Nylok self-locking hexagon head cap screws hold tight, speed production, simplify design

NOW STOCKED IN ALL STANDARD SIZES FROM 1/4 TO 1 INCH

A Cleveland Nylok® hexagon head cap screw is self-locking — won't work loose. The locking device is a tough, resilient pellet of nylon that forces the mating threads together in a secure metal-to-metal union. All auxiliary locking devices are eliminated. Seated or unseated, the screw locks wherever wrenching stops. And because of "plastic memory," the pellet tends to recover its original shape and the screw can be used repeatedly.

These self-locking cap screws give uniform torque and will not gall or damage

threads or seating surfaces. They are not affected by aging or by temperatures from -70° to +250°F. Further, when screws are properly seated, the locking pellet functions as a liquid seal.

You will save on production time when you use Cleveland Nylok self-locking screws. In addition, you can simplify design and reduce size, weight and inventory. Contact your Cleveland distributor for these self-locking screws in all standard sizes from 1/4 to 1 in., in high carbon quenched and tempered steel (C-1038).

*T.M. Reg. U.S. Pat. Off., The Nylok Corporation

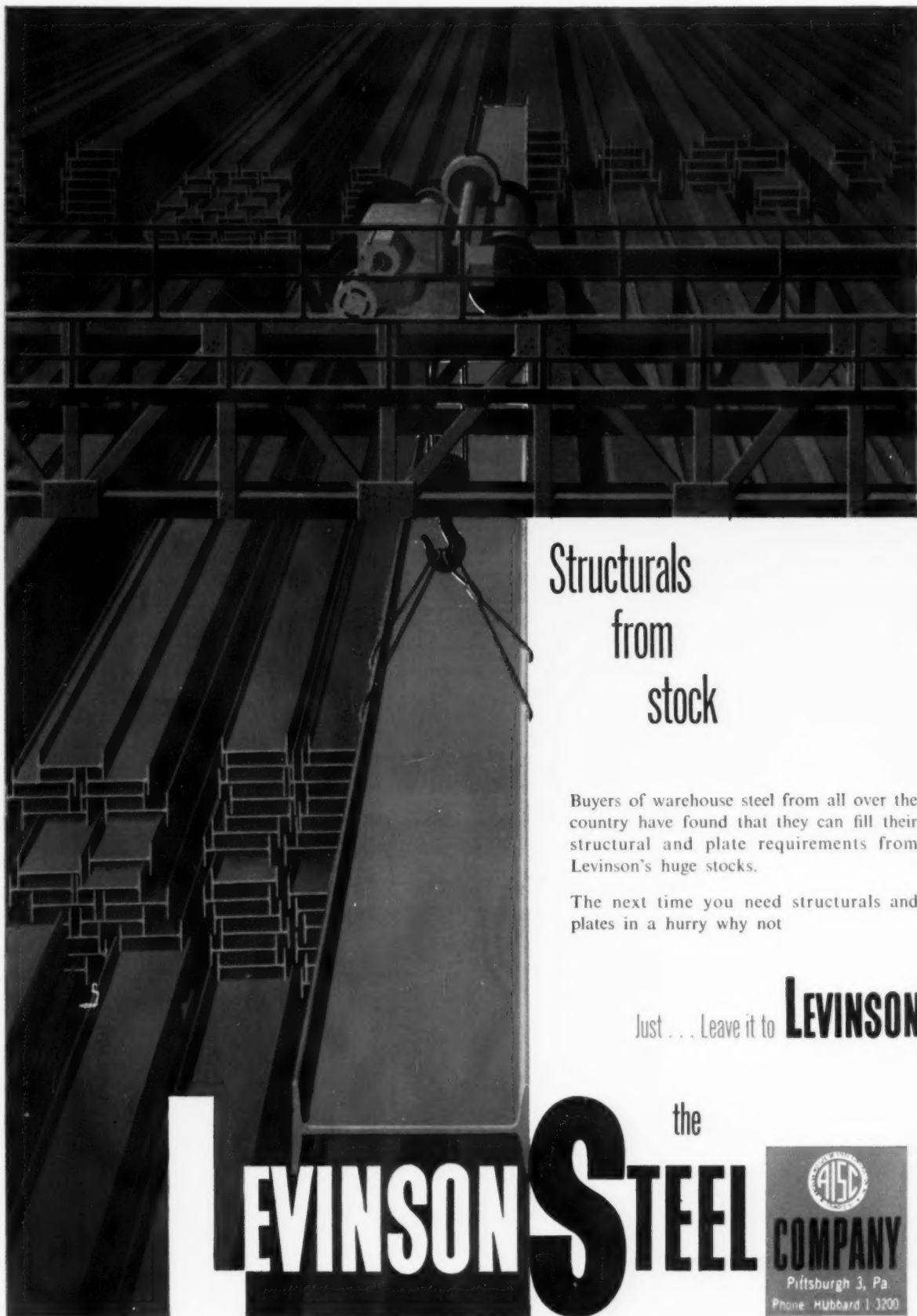


THE CLEVELAND CAP SCREW COMPANY

4444-1 Lee Road, Cleveland 28, Ohio

WAREHOUSES: Chicago • Philadelphia • New York • Los Angeles

Write today for your copy of the Cleveland Nylok folder giving complete technical data and specifications on self-locking hexagon head cap screws. We can also supply other standard and special screws with the Nylok self-locking feature.



Structurals from stock

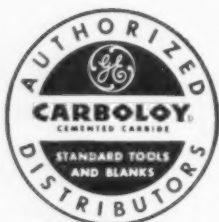
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New G-3 Series Gas Trucks Have Famous Yale Quality—Premium Engineering Features Included as Standard:

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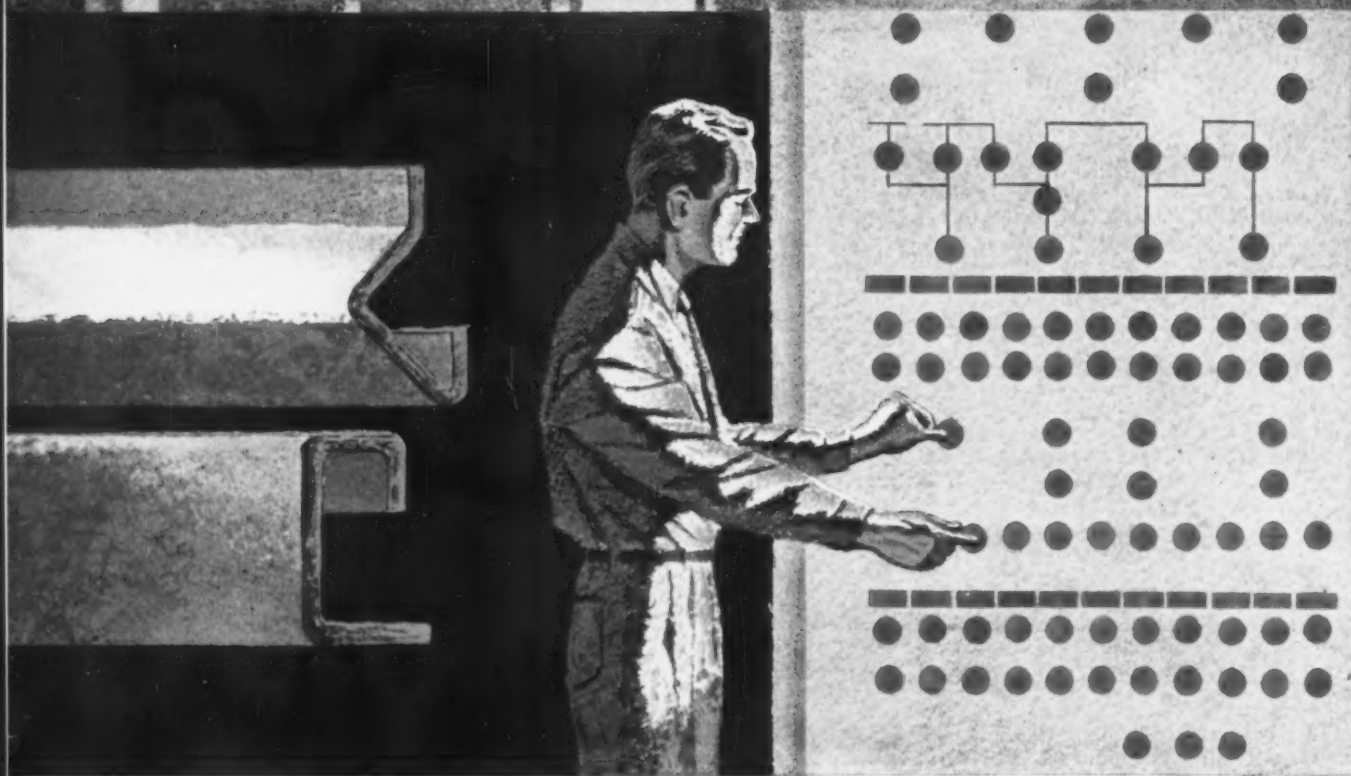
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Today a Westinghouse horizontal, roller-hearth furnace and work handling system automatically handle and anneal the same charge in two-thirds the time with only two operators. Westinghouse engineered all equipment to coordinate with increased production. From a single operator station, heat and quench cycle variables are quickly programmed for every batch of extrusion shapes.

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Furnace maintenance and work handling costs can eat up the profit from increased production. Over 40% of the furnaces in operation today are obsolete . . . at least 60% are twenty years old. When you have to heat-treat faster, it makes sense to specify Westinghouse equipment, developed to keep production profitable.

Westinghouse engineering puts complete equipment answers in your hands . . .

Our engineers design complete heat-treating systems using gas or electric furnaces or induction heating. From a single source you get the latest equipment answers to coordinate work handling, complete control, atmosphere preparation, furnace design and construction, quenching arrangements and safety precautions.

. . . with these flexible, timesaving steps

1. Start by calling in your local Westinghouse industrial heating representative. His analysis and on-the-spot suggestions develop your objectives.
2. Engineering and metallurgical specialists bring together equipment designed to meet your objectives.
3. Westinghouse Metallurgical Research Department and Metals Pilot Plant may be called on for process improvements or test runs under simulated conditions.
4. Westinghouse complete responsibility for your heat-treating system does not end until operation checks out your personnel in actual use.

This is another example of the way Westinghouse helps you POWER-UP . . . to get better production and profit from your electrical dollar. Call in your Westinghouse representative today, or write Westinghouse Industrial Heating Division, Meadville, Pa.

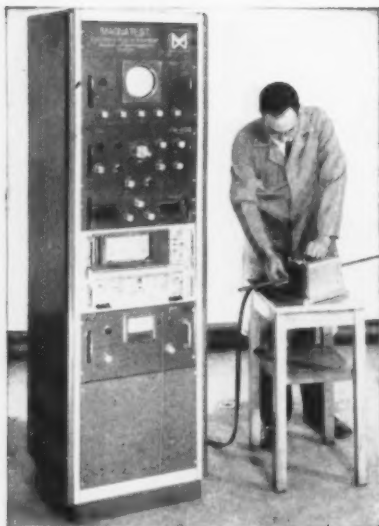
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The **MAGNATEST FW-400 Series** is electronic, eddy current equipment for non-destructive testing of non-magnetic rod, wire, or tube from 1/64" to 3" diameter. The test is fully automatic and can run at high mill rates (up to 400 and 500 f.p.m.). With the FW-400 such problems as seams, cracks, concentrated porosity, inclusions, stringers, laps, and splits may be detected at the level required. Diameter variation, embrittled areas, and scale are other conditions found with the unit.



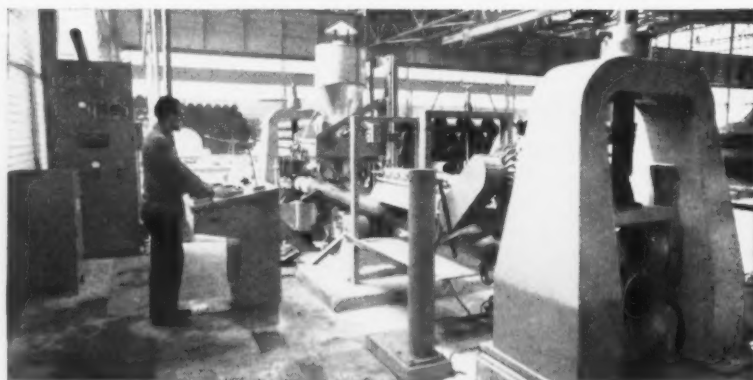
SEMI-AUTOMATIC MAQ 1694 MAGNAFLUX. Unit speeds end inspection for rod mills. A special conveyor extension carries short coil-end samples through a Magnaglo bath. They are then magnetized automatically and pass on to the curtained "black light" booth where defects, if any, show up as glowing indications on the rod ends. The Rate: 15 per minute. This system has cut inspection time in half and has eliminated the need for most acid etching equipment at several mills.

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Write for complete details concerning any of the above case studies or other tests in mills. Also, ask for our new booklet on "Lower Manufacturing Costs."

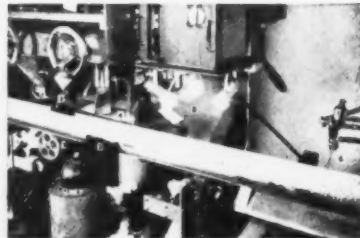
Case Studies: NONDESTRUCTIVE TESTING SYSTEMS



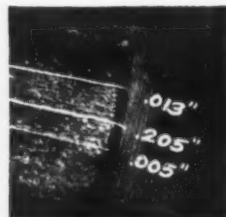
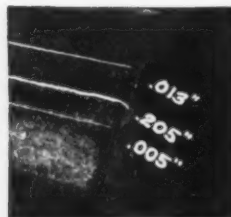
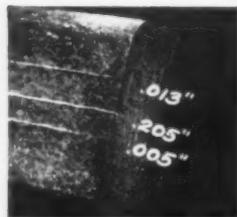
This picture shows the first new fully automatic Magnaflux PYQ equipment used in a steel mill on pipe weld testing. The man operates the mill itself, the Magnaflux unit uses photoelectric inspection.

New Methods Developed for Mill Tonnage Testing

Nondestructive testing has grown from a "sometimes" thing to a full time production tool in many mill operations. New techniques and methods have been developed for every type inspection. Whether the mill produces rods, tubes, rounds, squares, bars or billets, M offers semi or fully automatic inspection systems for practically every need. For instance, the type of defect most commonly found in resistance welded steel line pipe is longitudinal cracks in the weld. As shown in the illustrations above and at the right, such cracks can now be detected automatically right after welding. The crack is spray-marked on the pipe. This is done at production line speeds and without operator optical fatigue factors.



This unit tests pipe welds at rates over 100 ft. per minute. Magnaflux indications of defects are formed at location #4 in photo above. The new SN-100 Series photoelectric scanner automatically "sees" these defects at #5 area. This actuates #6 spring, wherever crack is present—to mark defect with paint.



MAGNAGLO INSPECTION VARIES TO FIND ONLY WHAT YOU WANT TO SEE!

After you decide what constitutes your own serious flaw, Magnaglo can help you achieve consistent quality in production. The magnetizing current and Magnaglo application can be varied and controlled to produce exactly the degree of sensitivity required for your quality standards. The photos above show the same billet inspected under varying techniques and amper-

ages, to suit different billet conditioning needs.

Note: variance of intensity of the Magnaglo indications. You can show or not show any depth seam you require, for each job you run.

Zygo can be similarly employed on non-magnetic billets, to increase yield and lower conditioning costs.

Take Your Inspection Problems to the House of Answers . . .

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hoover locks lube in, dirt out for the lifetime of the bearing



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Hoover is first to seal ball bearings with TEFLON! Hoover makes sure that lube stays in, dirt stays away from the smooth, mirror-like working surfaces of high quality *Micro-Velvet Lapped Balls* and *Hoover Honed Raceways*. You get greatly extended bearing life.

Why TEFLON for seals? TEFLON is the remarkable new product of chemistry . . . extra tough . . . extra long wearing . . . and so slippery that there is practically no torque resistance. Hoover seals are ingeniously engineered to maintain positive contact and improve lube circulation. Permanently attached full metal shields lock the seals within the bearing, safe from damage.

Use Hoover Ball Bearings with single or double seals of TEFLON for high speed applications, electric motors, or wherever periodic lubrication or maintenance is not practical, as in sealed units. They are available in both light and medium series.

*TEFLON is DuPont's Trademark for its Fluorocarbon Resins.
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Once around--and we'll have shipped your warehouse order for Timken® 52100 Tubing

THE hour hand on that watch goes around once in twenty-four hours. And before it gets completely around, we can ship your less-than-mill quantity order of Timken® 52100 tubing. We can save you time because we carry 101 sizes of 52100 tubing in our mill warehouse.

And you'll save money, too, with Timken 52100 tubing—by substituting it for costlier alloy steels. You get a steel that's through-hardened in

moderate sections, that can be hardened to file hardness or tempered back as you desire.

Hundreds of tons of Timken 52100 have been made into aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts and precision instruments.

You can rely on Timken 52100 steel. Our rigid quality control assures you uniformity from tube to tube, heat to heat,

order to order. We pioneered 52100 tubing in America, and we're the only company that makes 52100 steel in all three products—tubing, bars and wire.

Give us 24 hours and we'll have your Timken 52100 tubing on its way to you. It's available in O.D.'s from 1" to 10½" and a wide variety of wall thicknesses. Write, phone or wire: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO".

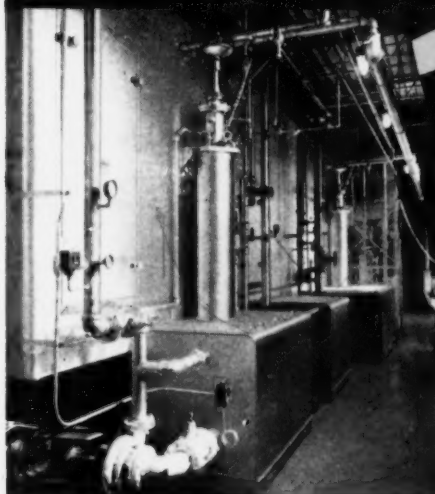
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SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING

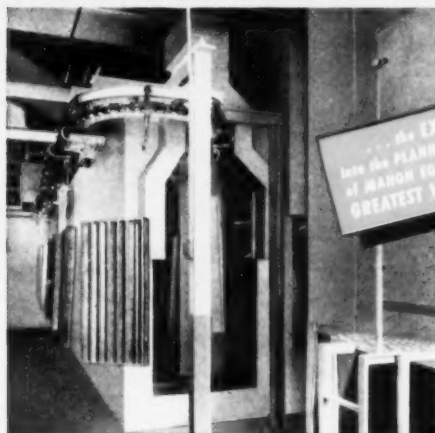
See the first Timken Televent hour, in color, "Eleven against the ice—story of the Antarctica Turnpike". NBC-TV, Monday night, Sept. 23rd.

COMPLETE *Finishing* SYSTEMS

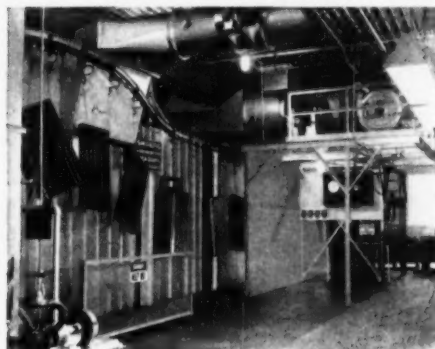
... for ENAMELS • LACQUER • PAINT • VARNISH



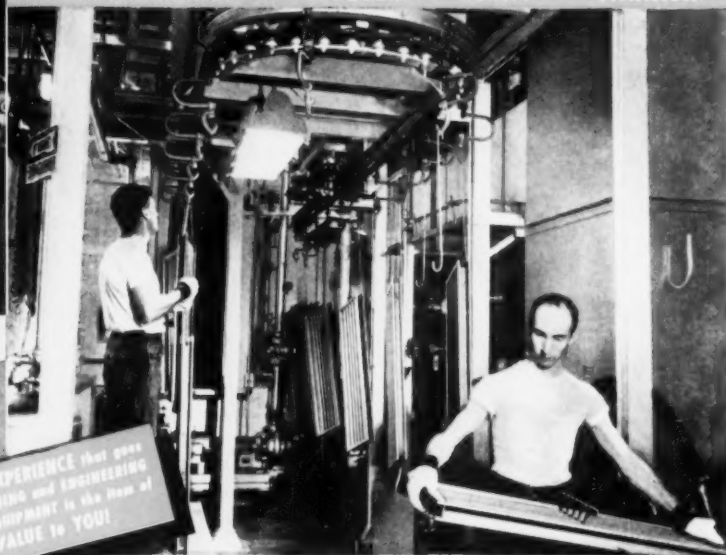
Partial View of Mahon Five-Stage Metal Cleaning and Bonderizing Machine in the Airlite System. Note Patented Fire-Jet Heaters.



Exit Opening in the Mahon Dry-Off Oven. This Oven is Combined with the Paint Baking Oven and Built as One Direct Gas-Fired Unit.



In the view above you see an Oven Heating Unit and a Control Cabinet which Houses Temperature Recorder and Safety Devices. Ventilated Solvent Vapor Chamber appears at left.



General View showing the Loading and Unloading Station in the Complete, Conveyorized Mahon Finishing System recently installed in the Airlite Company's Plant, Marietta, Ohio.

High Quality, Durable Finish on AIROLITE LOUVERS is Produced in a COMPLETE, MODERN MAHON SYSTEM!

The Airlite Company, Marietta, Ohio, manufacturers of high quality fixed and adjustable Louvers of all types, and numerous other metal products, have recently modernized production facilities which now include a complete, new Mahon Finishing System specially designed to accommodate all products presently in production as well as several items planned for the future. The new Mahon Finishing System in the Airlite plant includes a five-stage Metal Cleaning and Bonderizing Machine, Dry-Off Oven, Flow Coating Machine with a Ventilated Solvent Vapor Chamber, and a Paint Baking Oven . . . processing is continuous and automatic from conveyor loading to unloading. This is one of thousands of Mahon finishing systems that have been specially designed and installed in each case to meet the specific requirements of the manufacturer. If you have a finishing problem, or are contemplating new finishing equipment, you, too, will want to discuss methods, equipment requirements and possible production layouts with Mahon engineers . . . you'll find them better qualified to advise you, and better qualified to do the all-important planning, engineering and coordinating of equipment to produce the finest finish at minimum cost. See Sweet's Plant Engineering File for information, or write for Catalog A-657.

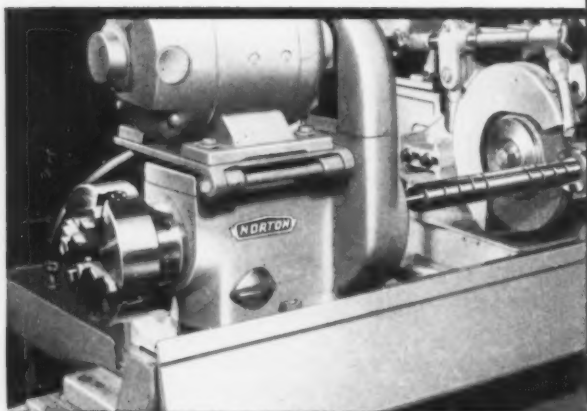
THE R. C. MAHON COMPANY • Detroit 34, Michigan
SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

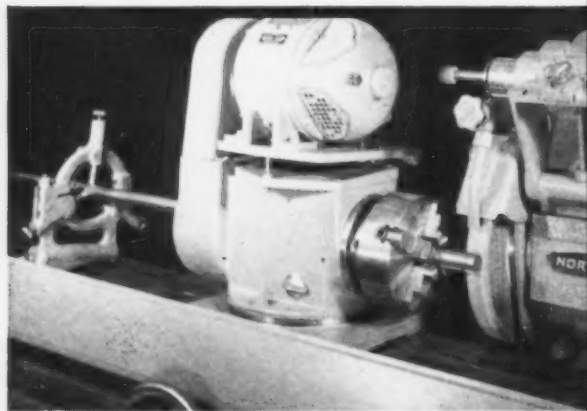
MAHON

Norton builds extra versatility into universal grinders...

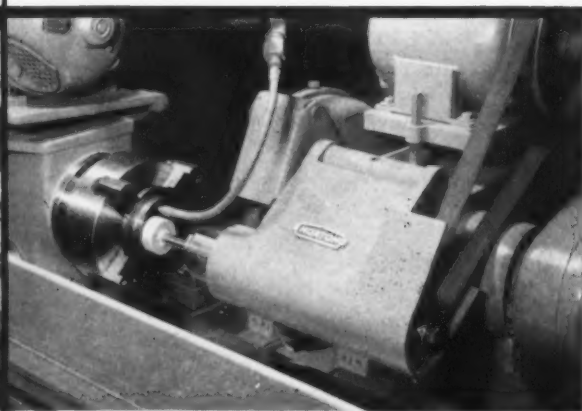
JOB-SPEEDING FEATURES



Minimum effort to change from dead center to chucking work. Chuck may remain mounted at back end of headstock while dead-center grinding.



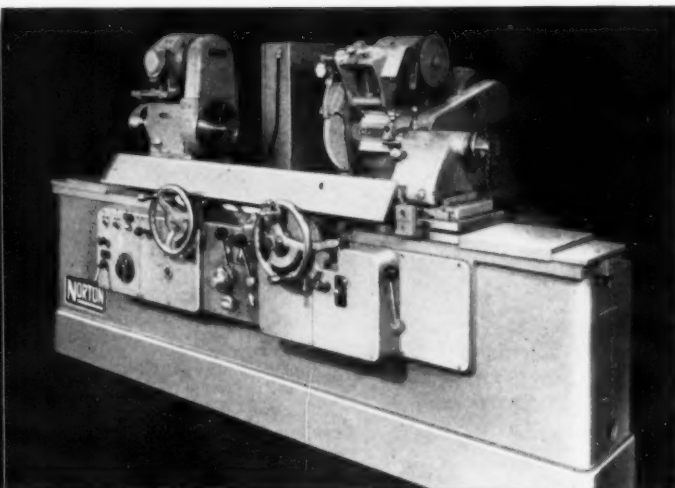
Hollow headstock spindle gives you additional capacity for grinding long bars by passing them clear through and supporting them in grinding position.



Hinged-bracket type internal grinding spindle swings up and out of the way when not in use. This means quicker setups for your I.D. or O.D. grinding.



Norton 10" universal grinder. Made with 20" or 24" nominal lengths between centers. Catalog 170.



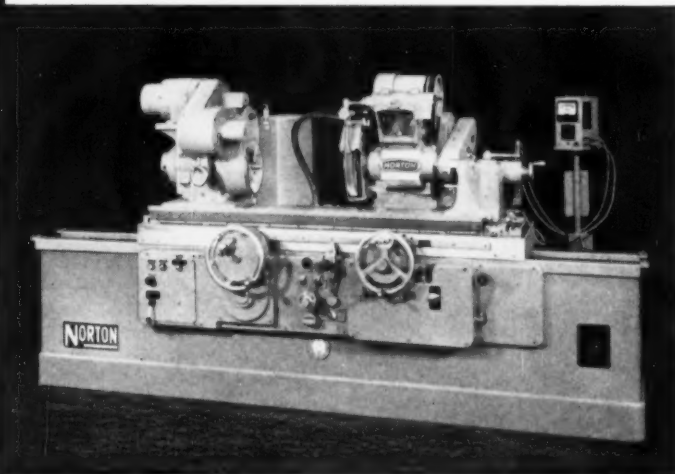
Norton 12" Type U-4 universal grinder. Made with 36" or 48" nominal lengths between centers. Catalog 231.

Many a user rates his Norton universal grinder as a practically "complete grinding department." Why? Because Norton builds extra versatility into its universals for faster external, internal, face, taper and angular wheel-side grinding, including many special jobs. Also they're built with many famous job-speeding, cost-cutting features: For example:

Extremely rapid chucking . . . quick change-over to live or dead spindle operation . . . easy work speed changes . . . independent wheel settings that do difficult jobs fast . . . extra capacities on wheel head and headstock . . . precise swivel table alignment with the SWIVALIGN Dual Electric Indicator, an optional extra.

Made In The Size You Need

Norton universal grinders are made in 10", 12", 14" and 18" swing capacities. That means you can get exactly the size to bring you many time-and-money-saving "Touch of Gold" advantages. For complete facts on these high-efficiency machines see your Norton representative or write us direct. And remember: Only Norton offers you such long experience in both grinding machines and grinding wheels to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Massachusetts.



Norton 14" Type U-4 universal grinder. Made with 36", 48" or 72" nominal lengths between centers and also in 18" swing capacity. SWIVALIGN* Dual Electric Indicator, at right of picture, measures swivel table adjustments and is optional on all Norton universal grinders. Catalog 819.

To Economize, Modernize with NEW



GRINDERS and LAPPERS

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes

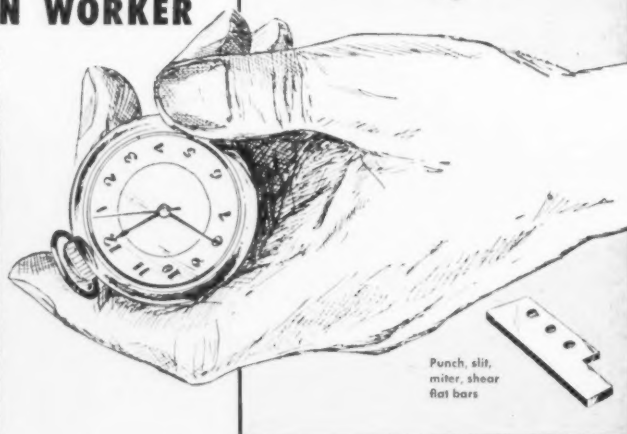
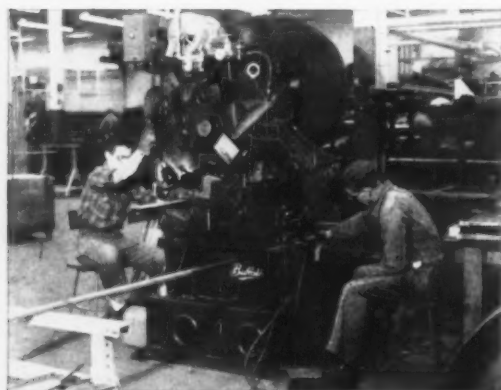
District Offices: Worcester • Hartford • Cleveland • Chicago • Detroit
In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

ALL THESE OPERATIONS ON ONE FAST MACHINE!

If your shop does two or more of the operations shown here, you'll be money ahead with a "Buffalo" Universal Iron Worker! Takes the space of one machine, does the work of six — two operations at once! No tool changes required. Built to take the strain and shock of your heaviest production or maintenance work, the frame is of rigid arc-welded heavy steel plate, and the one-shot lubrication system means minimum maintenance. Write for Bulletin 360 for details on the "Buffalo" Universal Iron Worker and its big brother, the "Buffalo" Unistructural Iron Worker for your heaviest structural work.

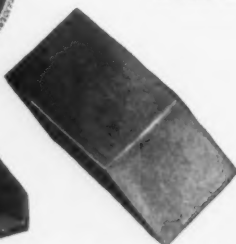
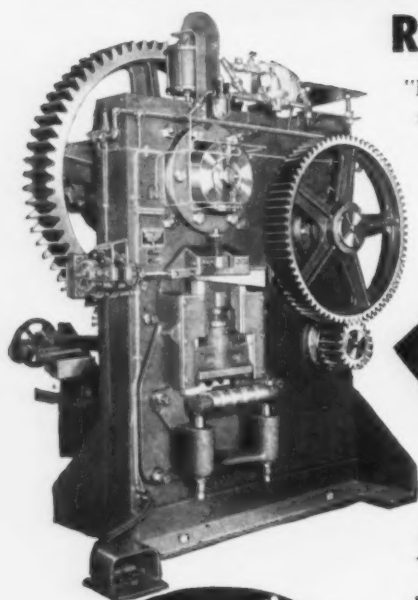
"BUFFALO" UNIVERSAL IRON WORKER



RAPID, CLEAN BILLET SHEARING!

"Buffalo" Billet Shears are saving money for forging shops by their high-speed dividing of round and square billets with clean, square cuts. Because the "shearing" is actually a straight *fracture*, there is no "smearing" to conceal possible porosity, as with burning or sawing — resulting in better inspection. 11 sizes to handle up to 10" rounds and 9" squares at 6 strokes per minute — correspondingly higher speeds in the smaller sizes.

Write today for Bulletin 3295-C.



"BUFFALO" BILLET SHEARS



BUFFALO FORGE COMPANY

492 BROADWAY

BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

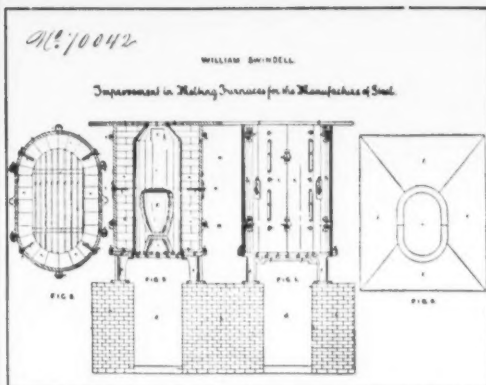
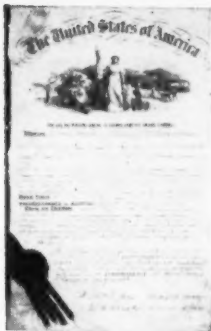
DRILLING

PUNCHING

SHEARING

BENDING





An early patent (No. 70,042 U.S. Patent Office) granted to Mr. William Swindell for an improved crucible furnace, for the melting of steel.

OVER 105 YEARS ... of knowing how

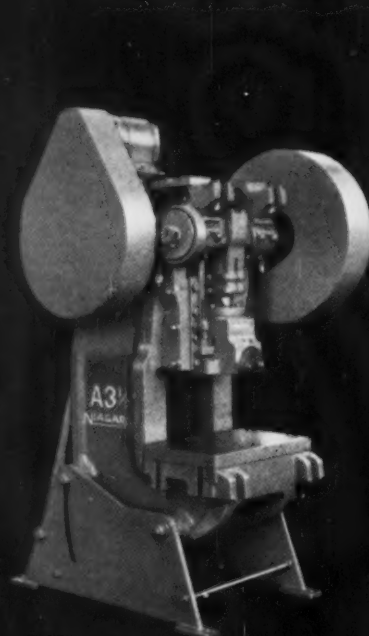
Today's SWINDELL Electric Melting Furnaces, employing the most advanced construction and operating features, reflect in their performance a continuity of steel-melting knowledge and experience extending over 105 years. In fact, a very large American steel producer has been our customer for 103 years. • *Knowing how* is one of the two great qualities in SWINDELL furnace production. The other is integrity. • Let us consult with you.

SWINDELL
**ELECTRIC
MELTING
FURNACES**

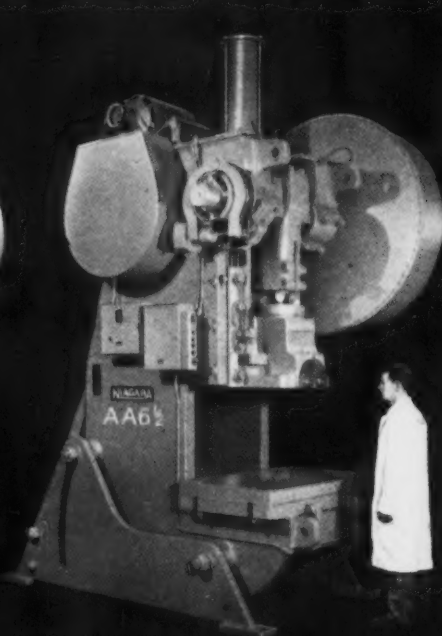


SWINDELL-DRESSLER CORP.
DESIGNERS AND BUILDERS OF
MODERN INDUSTRIAL FURNACES
Pittsburgh, Pa.

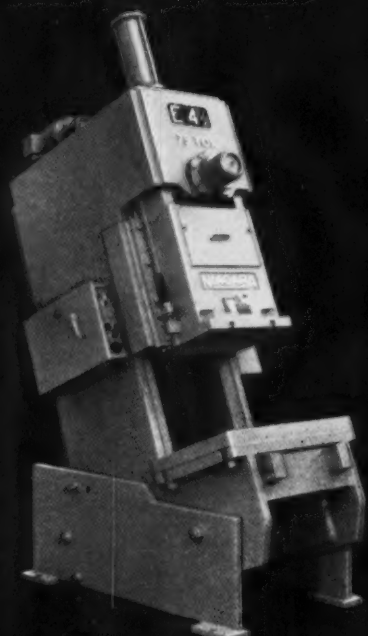
NIAGARA HAS THEM!



SERIES A, 5½-110 tons

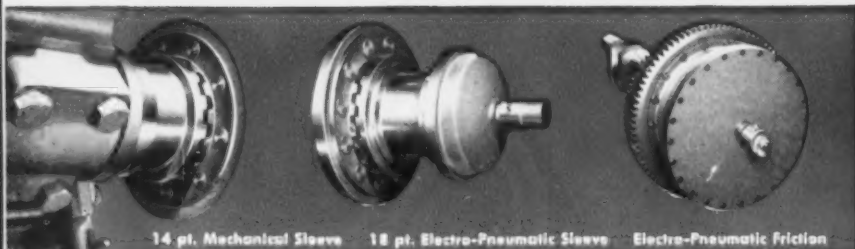


SERIES AA, 32-200 tons



SERIES E, 75-200 tons
Front-to-Back Crankshaft

READILY EQUIPPED TO HANDLE



14 pt. Mechanical Sleeve 18 pt. Electro-Pneumatic Sleeve Electro-Pneumatic Friction

THREE TYPES OF CLUTCHES

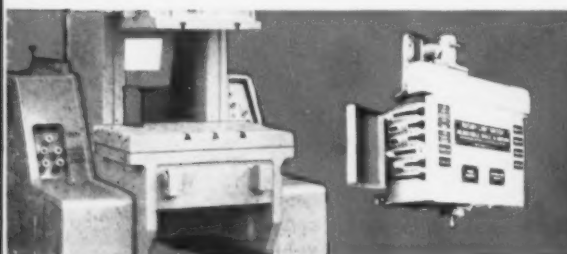
Each Niagara Inclinable features the clutch best suited for the purpose. (1) Famed Niagara multi-jaw mechanical sleeve clutch. (2) Exclusive Niagara multi-jaw Electro-Pneumatic sleeve clutch. (3) Niagara low inertia Electro-Pneumatic friction clutch.



Single Cylinder Tandem Type

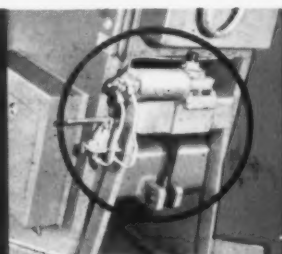
FOUR TYPES OF DIE CUSHIONS

Designed and manufactured by Niagara, single cylinder and tandem type pneumatic die cushions are built in 4 types to make any Niagara Inclinable a double action press. Self-lubricating models are available for automated OBI's.



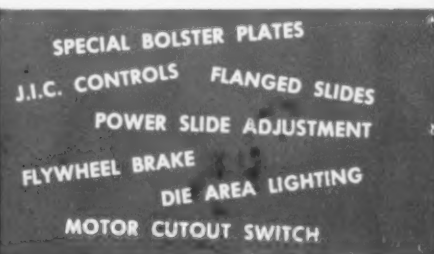
EQUIPPED FOR AUTOMATION

Featuring the most advanced controls and devices, Series EA (automated models) are engineered for peak productive capacity. Here's a line of OBI's that is completely equipped by Niagara for operation in your automation lines.



POWER INCLINING DEVICE

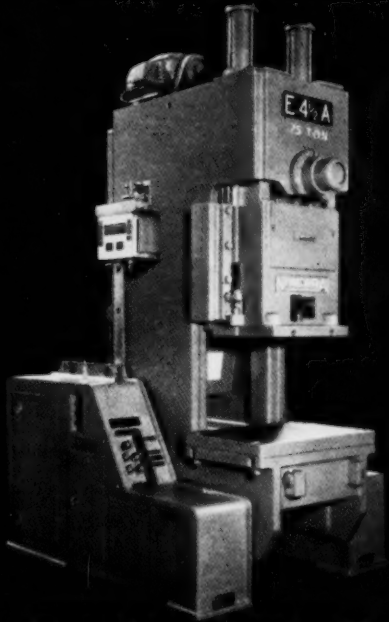
Fast-acting, safe and easy to operate, Niagara's air motor inclining device (shown above) is furnished as an optional accessory.



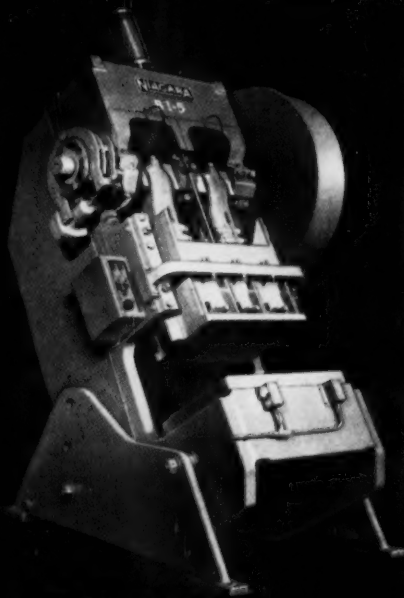
WIDE CHOICE OF ACCESSORIES

With a full selection of modern press accessories available, Niagara Standard Inclinables are adaptable to the widest possible range of job assignments.

standard OBI presses in all sizes and types that are right for you!



SERIES EA (Automated), 75-200 tons
Front-to-Back Crankshaft



SERIES BI, 60-200 tons
Double Crank

5 LINES . . . 34 MODELS
EACH A CHAMPION IN ITS CLASS:

Niagara offers you industry's most complete, most modern, and most exclusive selection of standard inclinables . . . plus an unequalled choice of press accessories and automatic devices to meet your specific job requirements. You can count on Niagara for inclinables that will do the most to speed production, assure accuracy, prolong die life and hold down maintenance costs within your plant.

YOUR WORK MOST PROFITABLY



Manual



Automatic



Automatic Circulating

CENTRALIZED LUBRICATION TO FIT THE NEED

Niagara Inclinables are readily equipped with either manually-operated or automatic lubricators, or automatic circulating oil systems. It's one of the many ways in which Niagara outfits standard inclinables to meet individualized requirements.

ALL TYPES OF AUTOMATIC FEEDS

To speed production, Niagara Inclinables are easily equipped with complete, automatic feed arrangements: single roll, double roll, dial, chute, magazine and specially engineered types. Variable speed drives can be provided to allow adjustment for the optimum speed consistent with the die, material and feed length.



GET ALL OF THE FACTS on any or all Niagara Inclinable Presses. Consult with a Niagara representative. His recommendation will be impartial. He has all types of OBI's to offer. At your request, specific Bulletins on each series, containing complete information and specifications, will be mailed to you promptly.

NIAGARA

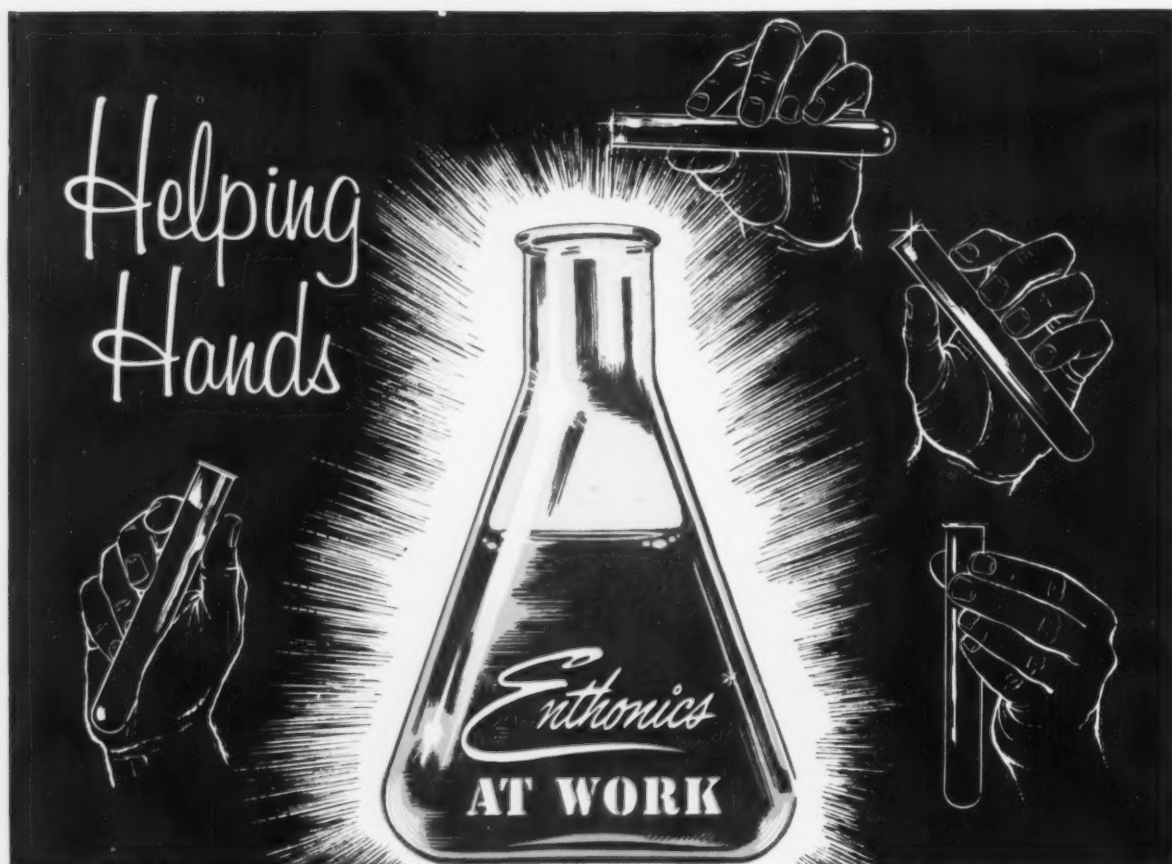
America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

DISTRICT OFFICES:

Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U. S. cities and major foreign countries



FROM THOUSANDS of TESTS come the solutions to your metal finishing problems.

If you are looking for creative chemistry to supply new methods for the improvement of metal finishing, look to the leader — ENTHONE. Write for the answers to these problems, identifying them by number. If your specific problem is not listed, Enthone will gladly help to find the answer.

1. HOW TO BLACKEN copper, brass, zinc, steel and other metals to meet U.S. Government specifications.
2. HOW TO STRIP NICKEL from steel without etching the steel.
3. HOW TO STRIP NICKEL from copper and brass without attacking the part.
4. HOW TO SHED WATER from metals to prevent staining or spotting during drying.
5. HOW TO TRAP FUMES from hot sulfuric acid pickles.
6. HOW TO STRIP SYNTHETIC ENAMELS from aluminum and other metals without attacking the metal.
7. HOW TO CLEAN AND REMOVE RUST AND OXIDES from steel in one operation without acids.
8. HOW TO RINSE AND DRY STEEL WITHOUT RUSTING, using cold or hot water.
9. HOW TO SHORTEN ALKALI CLEANING TIME for steel to 15 seconds.
10. HOW TO REMOVE SOLID DIRT AND OIL from metals.
11. HOW TO STRIP LEAD, TIN or soft solder from copper and brass with no etching.
12. HOW TO PLATE METALS upon aluminum.
13. HOW TO REMOVE EXCESS SILVER SOLDER chemically from silver brazed steel parts.
14. HOW TO MAKE PAINT STICK to brass and zinc.
15. HOW TO SOLVENT-CLEAN parts and assemblies with cold non-hazardous solvent.
16. HOW TO OVERCOME CHROMIC ACID CONTAMINATION in cleaners.
17. HOW TO PREVENT STAINING of chromium plate.
18. HOW TO GIVE ZINC AND CADMIUM high salt spray resistance.
19. HOW TO COLOR ALUMINUM in one operation.
20. HOW TO STRIP METAL COATINGS from zinc die castings.

** The Scientific Solution of Metal Finishing Problems.*



442 ELM STREET, NEW HAVEN 11, CONNECTICUT
 Metal Finishing Processes • Electroplating Chemicals



A Bundle of the Best...

and there's a size and type of Wallace Barnes high carbon strip steel to meet *your* specific use. Supplied in annealed state, hard-rolled, and hardened and tempered. Great forming properties, too. Get the facts.

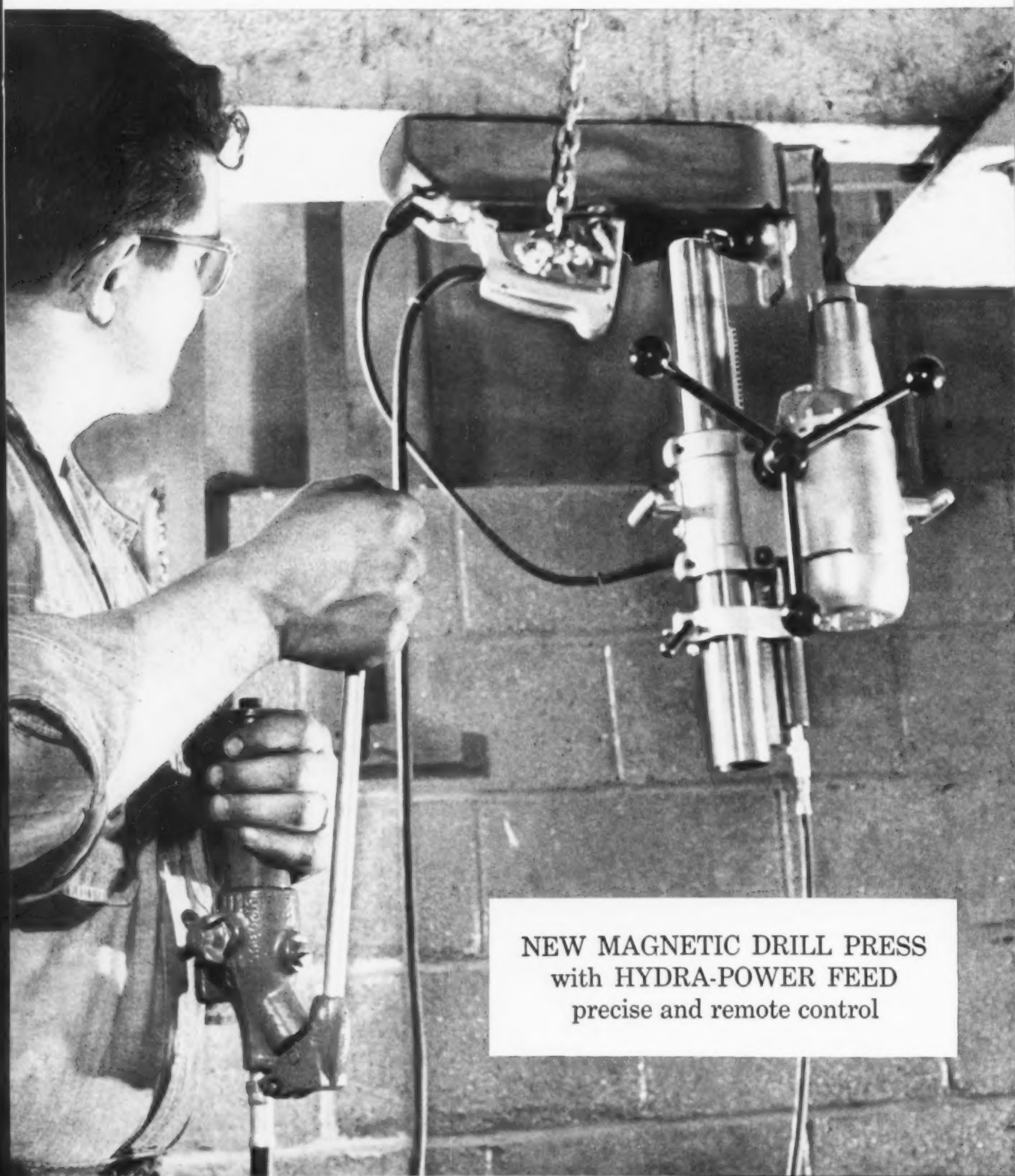
WALLACE BARNES STEEL DIVISION

ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT

ALSO MAKERS OF SPRINGS • WIRE FORMS • SMALL STAMPINGS



Takes the tough jobs.



NEW MAGNETIC DRILL PRESS
with HYDRA-POWER FEED
precise and remote control

..standing on its head!

Mail coupon below for free demonstration of NEW Black & Decker Magnetic Drill Press!

**Stable, one-piece power unit,
built-in drill point locator
insure finest precision!**

The new B&D Magnetic Drill Press is so loaded with user-wanted features—that it just has to be seen to be appreciated. To see it at work on your own application, mail coupon below for a free demonstration.

For instance: Its exclusive two-piece construction makes it simple to position the magnet. The built-in drill point locator makes accurate placement effortless. An easy twist of the 1¼" capacity drill press unit locks it in place on the magnet.

And it's there to stay! Extra power magnet clings to ½" and thicker steel with a giant's grip. This new B&D Magnetic Drill Press needs no cool-off period. It's stable in any direction, provides highest accuracy at all times.

Like the full line of B&D Portable Drills, this new tool is power-packed, quality built. See it for yourself. Mail coupon for free demonstration to THE BLACK & DECKER MFG. CO., Dept. 0909, Towson 4, Md. (In Canada: P.O. Box 278, Brockville, Ont.)



Look Under
"TOOLS-ELECTRIC"
in Yellow Pages

Black & Decker®

Quality Electric Tools—Power-built to set the pace



DRILLS



IMPACT
WRENCHES



SANDERS

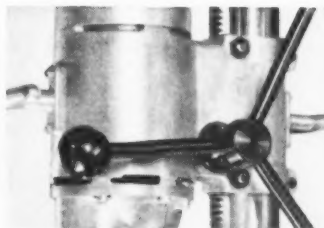
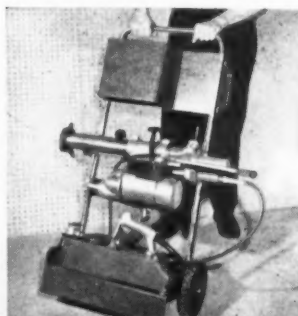


SHEARS

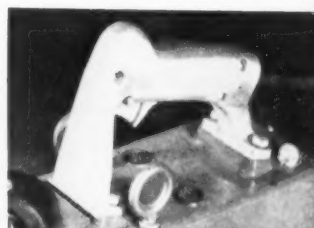


NIBBLERS

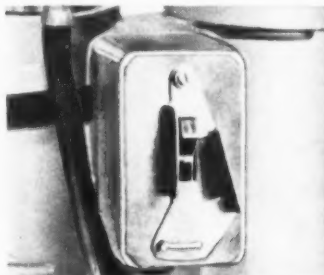
EXCLUSIVE TWO-PIECE CONSTRUCTION (magnet separate from drill press) and tool caddy for easier, safer handling. Caddy keeps tool in one place—ready for the job. Unit placed in position with minimum exertion.



UNITIZED CONSTRUCTION of drill press cannot work loose, no side play, maintains highest accuracy.



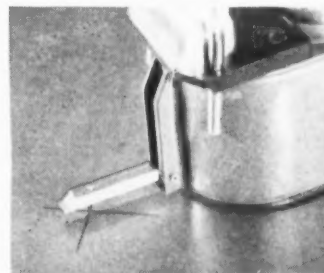
SAFETY-GRIP SWITCH keeps magnet always "on" after operator releases switch trigger—another safety plus.



REVERSING SWITCH with time delay prevents motor being reversed too rapidly. Adds longer life—increases safety.



VERSATILE MAGNETIC UNIT can be used apart from drill press to hold pieces for butt welding and other jobs.



DRILL POINT LOCATOR provides accuracy never before possible. Gets close tolerances fast. Built into magnet.



EXCLUSIVE HEADLIGHT directs bright beam on work area. Special ruggedized bulb withstands hard usage.

MAIL TODAY FOR FREE DEMONSTRATION

The BLACK & DECKER MFG. CO., Dept. 0909, Towson 4, Md.

☐ Please arrange a demonstration of the new B&D Magnetic Drill Press.

☐ Please send me additional information.

Name.....Title.....

Company.....

Address.....

City.....Zone...State.....

from **DEMOLITION**
to **CONSTRUCTION**
anywhere—anytime



Specializing in:

- **BLAST FURNACE CONSTRUCTION**
- **SALAMANDER OR SLAG REMOVAL**
- **CONTROLLED BLASTING OF CONCRETE OR MASONRY**
- **AUTOMATIC CONTROL SYSTEMS**
- **ALL TYPES OF INDUSTRIAL OR COMMERCIAL CONSTRUCTION**

No matter the hour . . . nor the problem . . . steel-producing men the country over know that when trouble erupts unexpectedly in the mill, the firm to call for help is **THE EDWARD GRAY CORPORATION** (formerly known as Chicago Concrete Breaking Company).

No construction or demolition job is too small, too involved. The reason: Experienced men like H. D. Putnam, Vice President in charge of field operations.

Putt is highly respected for his experience and ability to evaluate a situation, to determine what has to be done, then quickly and efficiently coordinate the men and equipment to complete the job. Whatever the problem . . . from a one-man repair job to a major construction project . . . where time (as well as budget) is of prime importance . . . remember the firm that is comprised of men like H. D. "Putt" Putnam.

GENERAL OFFICES
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TELEPHONE BAYPORT 1-8400

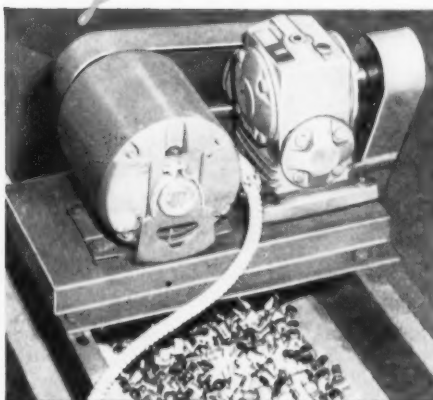
T H E E D W A R D
GRAY
C O R P O R A T I O N
FORMERLY CHICAGO CONCRETE BREAKING CO.

PITTSBURGH DISTRICT
213 COREY AVENUE, BRADDOCK, PA.
TELEPHONE ELECTRIC 1-1656

Cost-wise design calls for STANDARDIZED BOSTON Gear SPEED REDUCERS

FROM STOCK!

BOSTON GEAR
Standardized
Speed Reducers
take top-rating
in any test.
Why pay more,
— why wait,
for "specials?"



LASTING POWER ECONOMY, long wear, easy maintenance and quiet operation make Boston Gear Speed Reducers the practical choice for drives in materials handling equipment. A 100 Series Model T Reductor is used in the conveyor drive illustrated, where production of 4,000,000 lamp bases per day requires continuous, trouble-free operation.



COST OF SPECIAL MACHINES IS MUCH LESS when designed around Boston Gear Standardized stock components. A 100 Series Model VMW Ratiomotor drives this automatic stripping and soldering machine for fuse plug lead wires. Assembly also includes standard stock Boston spur gears, rack, pillow blocks, pulleys, sheaves, and bushings.

1605 TYPES and RATIOS FROM STOCK

REDUCTORS



Ratios
1:1 to 3600:1
.004 to 50 HP

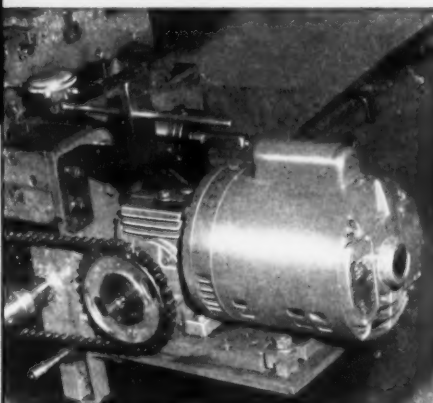
RATIOMOTORS

Output RPM .49 to 175



FLANGED REDUCTORS

Ratiomotor
gear assemblies,
sold without motor.
You buy and
attach your
choice of motor.



INCREASED COOLING EFFICIENCY of the finned housings of Boston Gear Speed Reducers dissipates heat rapidly. This permits compact design and higher torque capacity, of special advantage in machine tool drives like the 100 Series Model M Ratiomotor illustrated, and where space is limited, or where high area temperatures prevail.



STANDARDIZED VARIABLE SPEED DRIVES, assembled from Boston Gear stock parts, simplify the design job, and save the time required to procure special equipment. The illustration shows a Boston Gear Variable Speed assembly with a Type TW Reductor, used with Boston stock sprockets and chain to drive conveyor belt of a heat-treating furnace.

Your nearby Boston Gear Distributor can furnish any model you need, *from stock*. His factory-trained specialists will advise you on selection to simplify design and assure maximum economy. Be cost-wise . . . **STANDARDIZE and SAVE**. Boston Gear Works, 72 Hayward St., Quincy 71, Mass.

Catalog No. 56 lists
complete specifications
— selection data



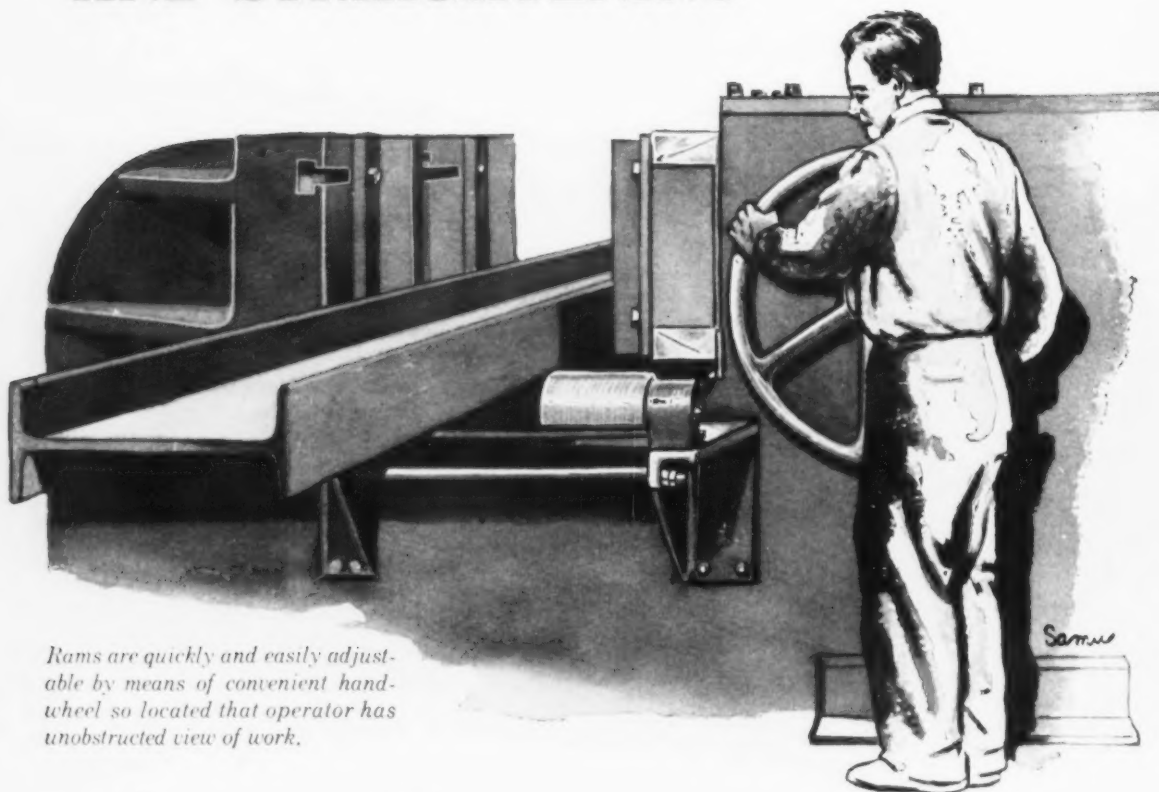
CALL
YOUR

BOSTON Gear
DISTRIBUTOR



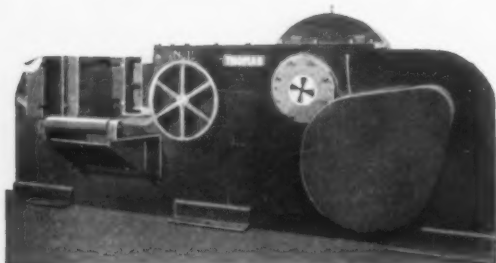
7124 "OFF-THE-SHELF" TRANSMISSION PRODUCTS FROM STOCK — AT FACTORY PRICES — ASK FOR CATALOG
Stock Gears • Sprockets and Chain • Speed Reducers • Bearings • Pillow Blocks • Couplings

FOR *Cold* BENDING AND STRAIGHTENING



Rams are quickly and easily adjustable by means of convenient hand-wheel so located that operator has unobstructed view of work.

of **Bars, Billets, Structurals, Rails, etc.**



This view of Thomas Bending and Straightening Machine shows operator's side. Thomas engineers have designed this unit to provide maximum performance and minimum operating cost.

The trend is to Thomas

**PUNCHES • SHEARS • PRESSES
BENDERS • SPACING TABLES**

The Thomas all-steel Bending and Straightening Machine is built in six sizes, varying from 50 to 400 tons. It is clean, modern, streamlined and self-contained, does the job quickly and efficiently, and conserves floor area in your plant.

Write for Bulletin 315.

THOMAS
MACHINE MANUFACTURING CO.

PITTSBURGH 23, PA.

Columbia Tool Steels for 1957-58 with A.I.S.I. Identification and Type Classification of Tool Steels

Identifying Elements, in Per Cent

GRADE	Type	C	Mn	Si	Cr	Ni	V	W	Mo	Co	Cl
WATER HARDENING TOOL STEELS — TYPE SYMBOL W											
Columbia SPECIAL	W1	.60/1.40	—	—	—	—	—	—	—	—	—
Columbia EXTRA	W1	.60/1.40	—	—	—	—	—	—	—	—	—
EXTRA HEADERDIE	W1	.60/1.40	—	—	—	—	—	—	—	—	—
Columbia STANDARD	W1	.60/1.40	—	—	—	—	—	—	—	—	—
Columbia ELECTREX	W1	.60/1.40	—	—	—	—	—	—	—	—	—
VANADIUM EXTRA	W2	.60/1.40	—	—	—	—	.25	—	—	—	—
VANADIUM STANDARD	W2	.60/1.40	—	—	—	—	.25	—	—	—	—
	W3	1.00	—	—	—	—	.50	—	—	—	—
	W4	.60/1.40	—	—	.25	—	—	—	—	—	—
WATERDIE EXTRA	W5	1.10	—	—	.50	—	—	—	—	—	—
WATERDIE STANDARD	W5	1.10	—	—	.50	—	—	—	—	—	—
	W6	1.00	—	—	.25	—	.25	—	—	—	—
	W7	1.00	—	—	.50	—	.20	—	—	—	—

SHOCK RESISTING TOOL STEELS — TYPE SYMBOL S

BUSTER	S1	.50	—	—	1.50	—	—	2.50	—	—	—
	S2	.50	—	1.00	—	—	—	—	.50	—	—
	S3	.50	—	—	.75	—	—	1.00	—	—	—
	S4	.55	.80	2.00	—	—	—	—	—	—	—
CEC SMOOTH CUT †	S5	.55	.80	2.00	—	—	—	—	.40	—	—

† With smooth cutting free machining additives

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILLINOIS — BRANCH STOCKS IN THE FOLLOWING CITIES:

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Phone LA 9-3632

Cincinnati 25
8716 Spring Grove Ave.
Phone MU 6-1840

Cleveland 14
1640 St. Clair Ave.
Phone MA 1-1785

Detroit 3
121 Oakman Blvd.
Phone UL 3-3770

Los Angeles 22
6955 E. Bandini Blvd.
Phone RA 3-4684

Milwaukee 19
5202 W. Lincoln Ave.
Phone LI 3-3500

St. Louis 13
5118 Eaton Ave.
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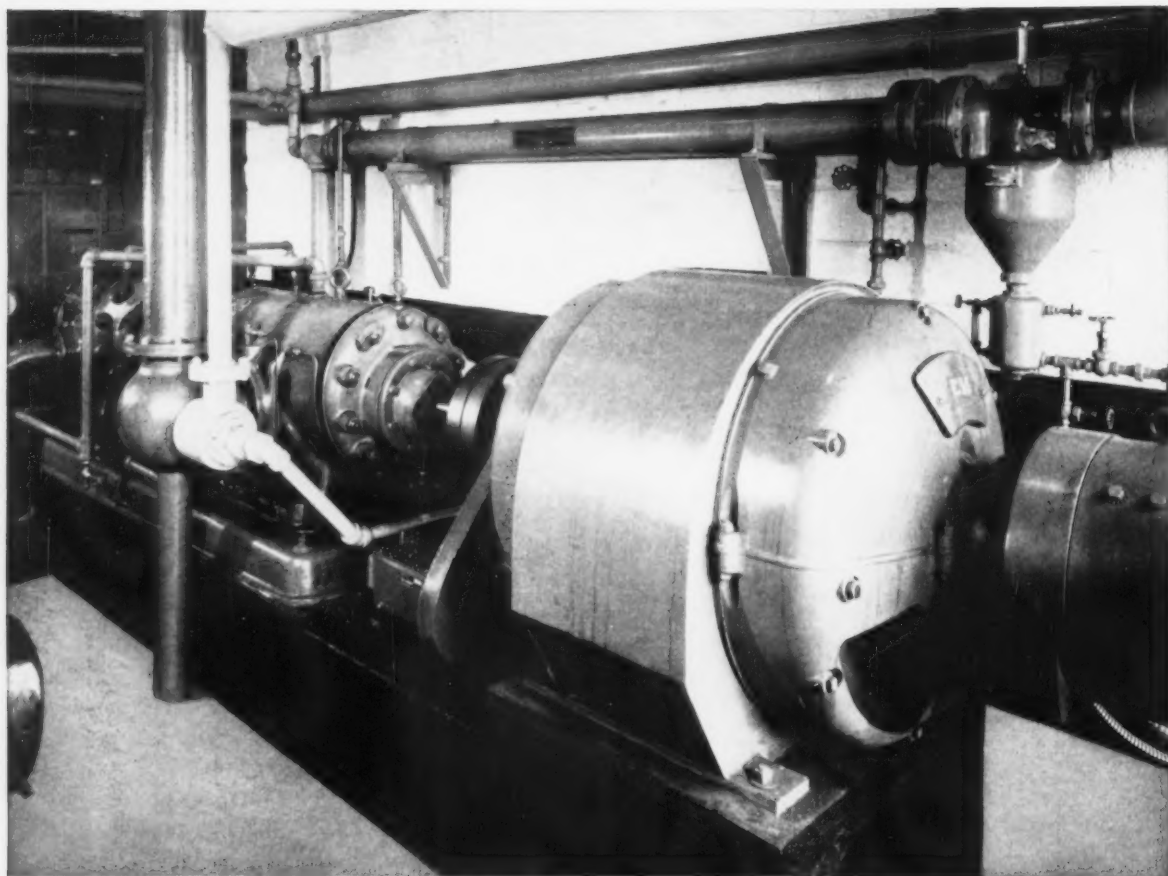
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First of a Series of Six Charts Covering
A.I.S.I. Tool Steel Type Classifications



THEY'VE ORDERED FULLER ROTARIES AGAIN AND AGAIN . . .

The proof is the record. Reading Tube Corporation bought its first Fuller Two-Stage Rotary Compressor in 1944—a C50-50H. To meet expanding pneumatic power requirements for increased production, they added a C100-100H Rotary in 1946. Again, the only and obvious choice was Fuller. In 1953, Reading Tube installed its third Fuller Rotary—a C175-175H, and reports continued satisfactory and economical operation, with a bare minimum of main-

tenance on all three.

Reading Tube Corp. uses Fuller compressors exclusively for such variety of needs as supplying air power in their casting shop, mill, draw benches, in testing and packing, as well as for hand accessories such as grinding, polishing, drilling, etc.

Check these advantages when your plant needs reliable air power . . . they've made Fuller the choice, time and time again.

- . . . full capacity for life of the machine
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- . . . sustained performance for top capacities up to 3300 c.f.m. and pressures to 125 pounds
- . . . compactness and ease of installation, requires minimum space and light foundation
- . . . vibrationless due to absence of reciprocating parts.

To get all the facts, write today for Bulletin C-5A.

C-310
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PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

Save by using specialized refractories

Many refractories problems in metal-working furnaces have been solved *economically* by the use of B&W specialized refractory castables. Each ferrous or non-ferrous furnace application requires a specific combination of properties to meet the service conditions. Whether your problem is high temperatures, abrasion and erosion, slag attack or the need for insulation, to name a few, you will find the refractory castable best suited to your requirements in B&W's line. Shown here in digest form are data on the widely used B&W refractory castables for metal-working furnaces:

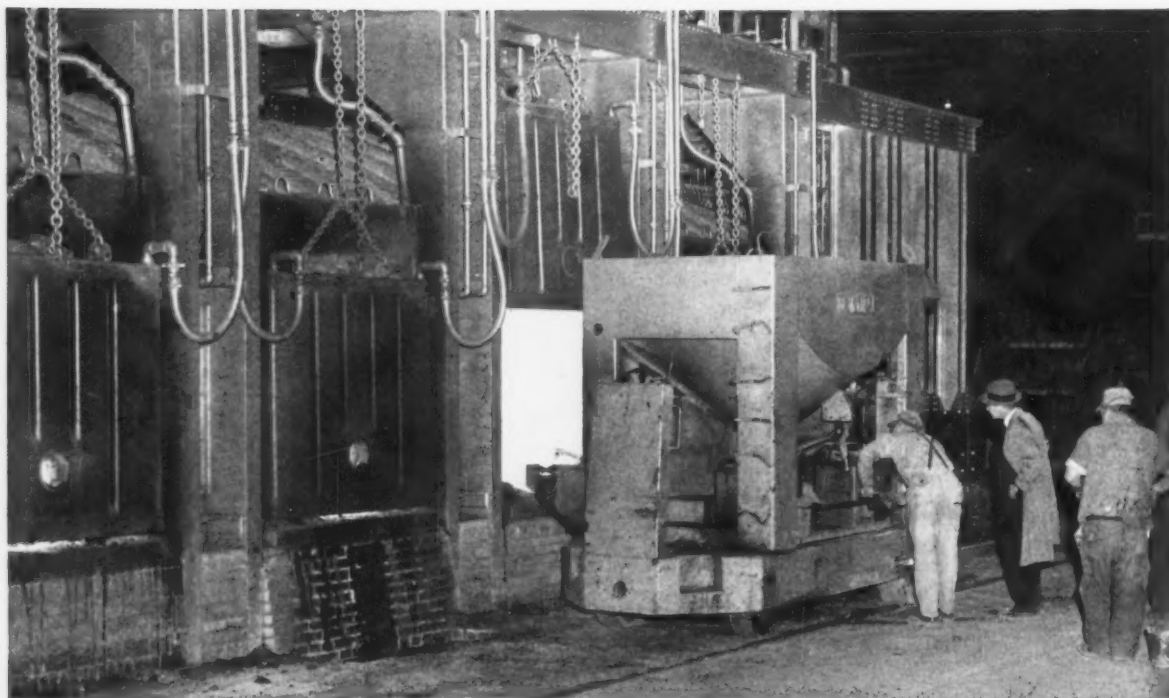
B&W Refractory Castables for Metal Working Furnaces

	Temp. F	PROPERTIES	TYPICAL APPLICATIONS
B&W Kaocast	3000	High resistance to spalling and slag attack. Low volume change and negligible reheat shrinkage.	Soaking pit covers, linings of high temperature heating and forging furnaces, burner blocks, electrode linings of electric furnace roofs, linings of non-ferrous metal furnaces.
B&W Kaocrete 32	3200	High strength, exceptional refractoriness, unusual volume stability, excellent resistance to spalling.	Can be used in applications similar to those of B&W Kaocast and where higher refractoriness is required.
B&W Kaocrete D	2500	Sufficient strength and hardness to withstand abrasion, considerable physical abuse and erosion.	Aluminum melting furnaces, linings and car tops in heat treating furnaces, as well as in sections of a wide variety of furnaces that are subject to scraping by hand tools or other mechanical abuse.
B&W Kaocrete A	2600	Resists reducing atmospheres. Has good resistance to erosion, abrasion and thermal shock.	Annealing furnace bases and other applications where resistance to reducing atmospheres is essential. Also as a general purpose castable for linings in medium temperature service.
B&W Kaocrete B	2300	Has an adhesive plastic texture particularly suited for vertical or overhanging constructions. Excellent for plastering.	Patching linings and baffles and for any application where plastering rather than gunning or casting is required.
B&W Kaocrete LI	2700	High alumina content, exceptionally high strength for resistance to abrasion and erosion.	Aluminum furnace linings where high alumina content is important.
B&W Kaolite 20	2000	Offers castable's fast, low cost installation plus insulation. Has refractoriness, light weight and low heat conductivity and, in addition, will resist reducing atmospheres. Can be poured or gunned.	Aluminum melting, heating and heat-treating, annealing and forge furnaces. Also for general maintenance and patching.
B&W Kaolite 22	2200	Has the same properties as B&W Kaolite 20. Can be used for higher temperatures but not in reducing atmospheres.	

Send for your copy of B&W Bulletin R-35. It gives additional information on B&W's versatile refractory castables.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide





for more heats per bottom and less "out time" between heats, specify

Baker's Magdolite or Jebcolite

Bottom troubles in modern open hearth and electric furnaces need no longer be an "everyday occurrence" . . . thanks to Baker's Magdolite and Jebcolite, the original dead-burned dolomites.

Today, these quality controlled materials provide a maximum of refractory oxides, crystalline lime and periclase . . . with just the right amounts of calcium ferrites and silicates to assure rapid setting in the furnace hearth.

You'll find that Magdolite and Jebcolite form a

non-porous, homogeneous mass. They set fast and stay fast. They're easy to handle, too . . . require less time to fettle a furnace . . . save minutes in down time for bank and bottom repairs which can soon mount up to additional heats and lower cost per net ton.

To minimize furnace bottom troubles, specify Baker's Magdolite or Jebcolite, products that are always five ways better: in composition, preparation, strength, economy and quality.

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BAKER'S MAGDOLITE

The original dead-burned dolomite

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Less downtime...lower upkeep...

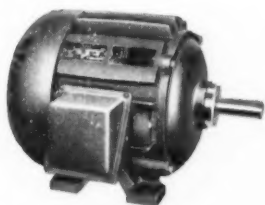
WITH

Wagner Protected Type Industrial Motors

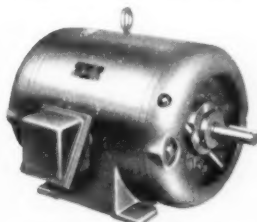
Wagner protected type motors lower your maintenance costs... cut down time, because they are designed for use where operating conditions demand EXTRA protection—for bearings or windings, against corrosive vapors or abrasive dirt, in explosive atmospheres or exposed outdoor locations.

Each of these Wagner Motors will give completely dependable performance in its specific application—with a minimum of maintenance. All these motors can be relubricated, when necessary, for longer bearing life.

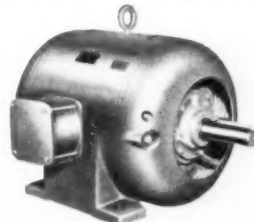
A Wagner field engineer, expert on motor applications, will be glad to help you choose the *right* motors for your specialized needs. Just call the nearest of our 32 branch offices, or write us for Bulletins on Wagner Industrial Motors.



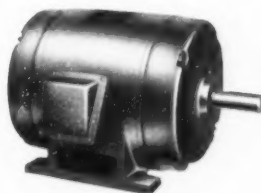
TYPE EP—Ribbed frame fan-cooled. New NEMA Frames. 1 to 30 hp.



TYPE EP—Totally-enclosed fan-cooled. Corrosion-resistant frames. 40 to 250 hp.



TYPE JP—Fan-cooled... Explosion-proof. Cast iron frames. 40 to 250 hp.



TYPE DP—Drip-proof... corrosion-resistant. New NEMA Frames. 1 to 30 hp.



TYPE DP—Drip-proof. Cast iron frames. 40 to 125 hp.



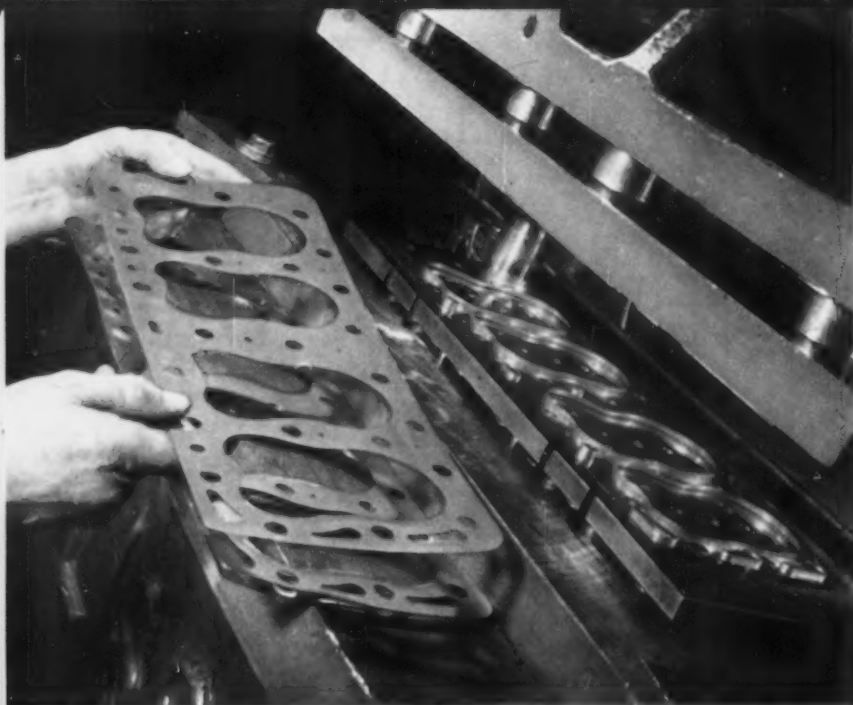
TYPE RP—Drip-proof. Fabricated steel frames. 125 to 500 hp.



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Steel's Strength, Copper's Fluidity (sealing ability) and corrosion resistance all are combined in Sterling Automotive Mfg. Co.'s use of Thomas copper-coated steel strip. By lubricating dies during punch press forming, copper coating boosted die life by 33%. The Chicago company turned to Thomas electro-coated strip to give its auto head gaskets extra strength needed for today's high-compression engines.



20 Million Shoe Horns a Year are made in Crawfordsville, Ind., plant of Steel Industries, Inc., where Thomas Strip saves up to 40% of production cost. From nickel-coated Thomas Strip, shoe horns get bright, shiny finish with only ball-burnishing after forming.

New Ways To Cut Costs With Thomas Strip

How Six Manufacturers Use These Production Ideas For Better Products



Ray-O-Vac Company saves \$100,000 a year at its Clinton, Mass., Flashlight Division, by using Thomas copper-coated strip for flashlight cases. Compared to brass, Thomas deep-drawing strip is fabricated faster, requires less processing — also, copper coating lubricates dies and provides good chrome-plating base.

Manufacturers pictured on these pages chose Thomas Strip because it cuts costs, improves products — gives them higher profits and increased sales.

Pre-coated Thomas Strip is furnished ready for use with electroplated coatings of zinc, copper, brass, nickel, or chrome . . . or hot dip coated with lead alloy or tin . . . and coated with clear or colored lacquer.

Uncoated Thomas Strip products include low carbon, alloy and high carbon spring steel grades. All are available in a wide range of sizes, gages, tempers and finishes.

You also can get cold rolled Thomas Strip plain or coated with a rolled-in pattern design of your choice.

All Thomas Strip products can save you money and enhance your product in six important ways:

- **Fabricates Easily** — coated steels stand fully as much fabrication as uncoated strip.



Increased Saleability and Profits followed Pioneer Can Co.'s switch from lithographed tin plate to brass-coated Thomas Strip with a rolled-in pattern design. Pioneer's waste baskets and decorative cans gained in durability, beauty and re-use value. They command a higher price now and return more profits.

General Electric's styling of its deluxe range made at Appliance Park calls for liberal use of pattern-rolled Thomas Strip. Deeply rolled rib design, satin chrome-coated, is used on oven door—adds distinctive modern touch to GE's Keyboard Ranges. Thomas offers many design patterns in plain or coated steels.

- **Longer Die Life**—most coatings lubricate dies, reduce wear and increase tool life.

- **Maximum Pieces Per Pound**—precision rolling to extremely close size tolerances gives more square feet of strip per ton.

- **Lower Plating Costs**—coatings can serve as final product finish or as base for further plating or painting.

- **Speeds Fabrication**—Thomas Strip coatings eliminate costly intermediate fabricating steps such as cleaning, buffing, even plating.

- **Steel's Strength and Economy**—are combined with beauty and utility of more expensive metals.

All the savings and benefits Thomas Strip specialties are giving to fabricators shown here are available to you. A national sales staff—familiar with design and fabrication advantages of Thomas Strip is ready to serve you.

Write for samples, and additional cases of users' actual experiences with Thomas Strip Products. Do it today.



Stack 'n Add is another new product of Quaker Industries, Kenosha, Wisc. The smart sectional shelving gets strength, beauty and economy through use of Thomas brass-coated, buffed and lacquered strip for upright supports. Electro-coated Thomas Strip eliminates expensive pre-forming preparation, as well as costly plating.

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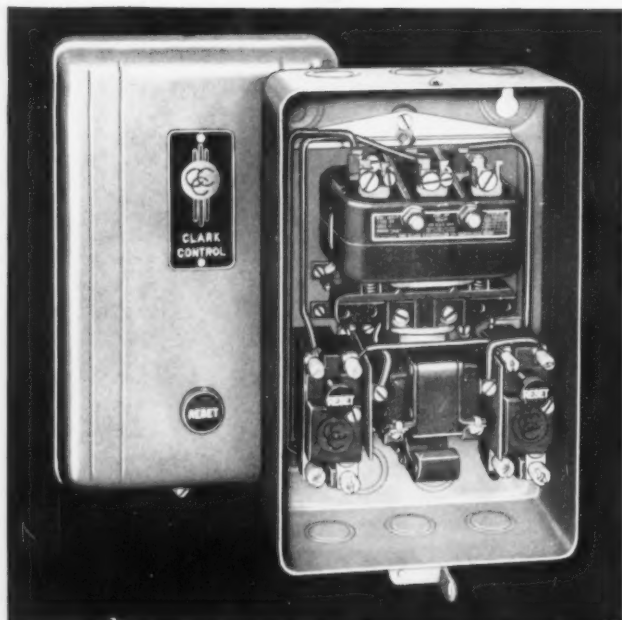
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CLARK Type "CY" Starters, sizes 0 and 1, now have higher NEMA horsepower ratings



IN ADDITION TO COST AND SPACE SAVING BENEFITS OF THE NEW NEMA RATINGS, CLARK Type "CY" STARTERS OFFER MANY OTHER ADVANTAGES:

Greater Dependability and longer life

- Heavy-duty mill-type construction.
- Large silver-to-silver twin-break contacts.
- Vertical lift, free-floating magnet uses no springs; pull characteristic assures positive contact closing and keeps magnet slam to a minimum.

Easier Maintenance

- Contacts and contact springs quickly and easily inspected—without tools.
- All parts readily accessible and replaceable from front without removal from panel or enclosure—screwdriver and wrench only tools needed.
- Magnet coils easily replaced.

Simplified Installation

- Generous wiring space.
- All terminals face the front.
- Pressure-type terminals line and load.

...and many others

As shown in the table below, NEMA maximum horsepower ratings for size 0 and 1 AC magnetic across-the-line starters have been increased. Clark Type "CY" starters now available to meet these new standards will, in many cases, permit you to meet your requirements with smaller sizes. You can at once take advantage of the money and space savings made possible by this re-rating.

CHANGES IN NEMA STANDARDS FOR MAXIMUM HORSEPOWER RATINGS OF AC MAGNETIC STARTERS AND CONTACTORS

SIZE AND VOLTAGE RATINGS	MAXIMUM HP RATINGS	
	OLD	NEW
THREE PHASE		
Size 0 110V	1½	1½
Size 0 208/220V	2	3
Size 0 440/600V	3	5
Size 1 110V	3	3
Size 1 208/220V	5	7½
Size 1 440/600V	7½	10
SINGLE PHASE		
Size 0 110V	1	1
Size 0 208/220V	1½	2
Size 0 440/600V	2	3
Size 1 110V	1½	2
Size 1 208/220V	3	3
Size 1 440/600V	5	5

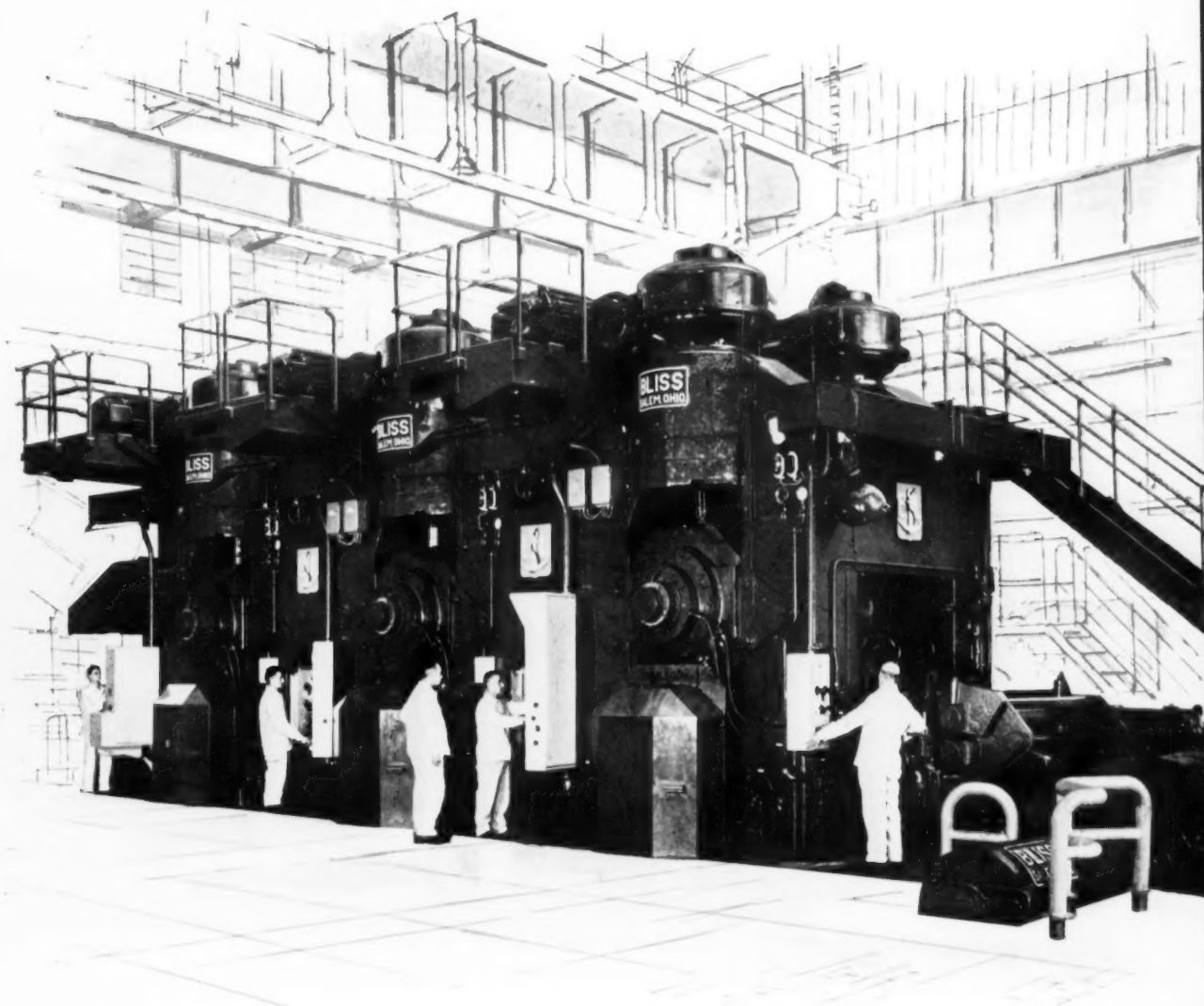
NOTE: HP ratings for plugging and jogging duty have not been revised.

These increased horsepower ratings for AC controls will be adopted for all forms of Clark across-the-line starting equipment.

Revised Clark Catalog sheets and price lists covering the new NEMA ratings are available on request.

The **CLARK**  **CONTROLLER** *Company*
Everything Under Control

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Espérance-Longdoz increases cold-rolling capacity with new Bliss mill

This 3-stand 4-high tandem mill at Ste. Ame. d'Espérance-Longdoz in Liège, Belgium is the first large multiple stand rolling mill in the Benelux countries. Built by Bliss' Rolling Mill Division, it rolls steel strip up to 52" wide from hot-rolled band down to thin cold-rolled strip. Mechanized entry and delivery equipment almost eliminate manual coil handling.

This modern cold reduction tandem mill is much

more than ample for Espérance-Longdoz to convert its present 600,000-ton hot-rolled production. What's more, the mill is designed to allow later addition of a fourth stand.

This installation is a typical example of how Bliss engineers design a mill to meet a customer's particular rolling problem. For other examples, write for our 60-page Rolling Mill Brochure, Bulletin 40-A.



100 years of making metal work for mankind

E. W. BLISS COMPANY, Rolling Mill Division, Salem, Ohio

Subsidiary: The Matteson Equipment Company, Inc., Poland, Ohio

A NEW Harbison-Walker Service-Proved Product

METALKASE XXP

and XP



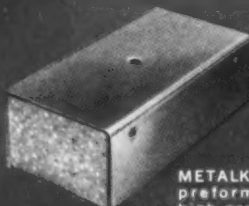
**Steel Encased and Internally
Plated Basic Brick Provide**

- **greater spalling resistance**
- **reduced peeling tendency**

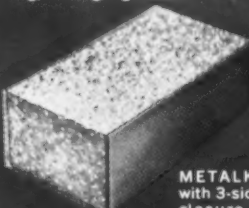
METALKASE XXP are chemically bonded basic brick with two internal plates, formed under high pressure, and are furnished in standard sizes, suspended arch and other shapes. They are available in various compositions. In the illustration the METALKASE XXP brick is cut to show the plated construction. These plates extend through the length of the brick.

METALKASE XP brick, having a single internal plate, are made in hard fired basic brick of various classes. They are available in standard sizes and many special shapes. These brick are used in various particular applications with great benefit.

Extensive use in service clearly demonstrates the superior spalling resistance of the internally plated brick, and as the result of improved stress relief, appreciably reduced tendency to peel.



METALKASE brick, preformed under high pressure and encased on all four contact sides by welding, in 22 gauge steel.



METALKASE brick with 3-sided steel enclosure, especially suited for electric furnace side walls and other specific applications.

Other Metalkase designs

HARBISON-WALKER REFRACTORIES COMPANY

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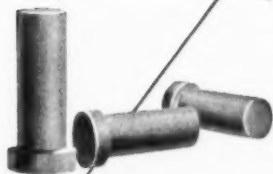


World's
Most Complete
Refractories
Service

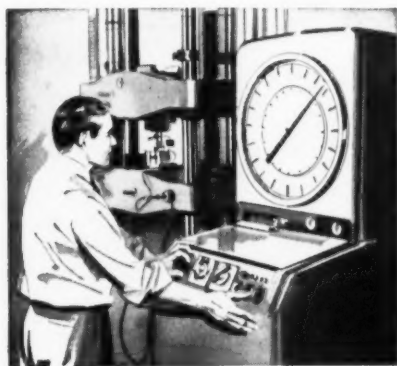
AIRCRAFT QUALITY

ALLOY CASTINGS

*...for the special
requirements of
your industry*



METALS PROCESSING DIVISION FOUNDRY
handles wide range of sizes,
closely controls dimensions



Precision testing methods
provide close control of
casting quality

Curtiss-Wright's Metals Processing Division today offers your industry precision castings of critical parts in a wide variety of sizes, and with closely controlled dimensions. For example, in the large casting shown, tolerance is $\pm .030$ over 36" diameter. From its modern, completely equipped foundry in Buffalo, the Division supplies heat, corrosion and abrasion resistant castings from a full range of special-property alloys, including ductile iron...by sand, centrif-

ugal, ceramic or shell processes.

Precision alloying techniques, modern melting controls with spectrometer testing, X-ray control by experienced radiographers — all add up to castings with superior physical and mechanical properties . . . mean better and more dependable products for the critical needs of industry. Qualified design engineering assistance is a part of the comprehensive Metals Processing Division service. Write for details.

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NEW U.S.I. ZIRCONIUM PLATELETS ELIMINATE SAFETY PROBLEM

You're looking at a new form of zirconium—the non-pyrophoric, non-hygroscopic platelets produced by U.S.I.'s new plant at Ash-tabula, Ohio. Zirconium platelets eliminate the handling hazards of the more familiar sponge metal because of their low ratio of surface to weight. Special shipping precautions are not required. Platelets also make possible a safer, cleaner melting operation.

Production of U.S.I. zirconium employs a new, semi-continuous sodium reduction process, yielding top-quality metal almost completely free of sodium, magnesium, chlorides, hydrogen and moisture. Prices are coming down too, and these will be reflected in lowered costs of fabricated parts. Zirconium equipment is expected to be available in the not too distant future for about twice the cost of stainless steel, depending upon the complexity of the part.

The new U.S.I. production facilities will make available an important new source of zirconium for both government and industrial use. By next year, a million pounds will be available for industry from U.S.I.'s new plant, over and above the million pounds per year committed to the A.E.C. Thus, a reliable source of high-quality zirconium will be available to the nuclear industry and to manufacturers of chemical processing equipment.

For further information write for the new booklet, "Zirconium and Hafnium". For detailed information and assistance on your particular problem, call Bill Greenleaf, Manager of Metals Development.

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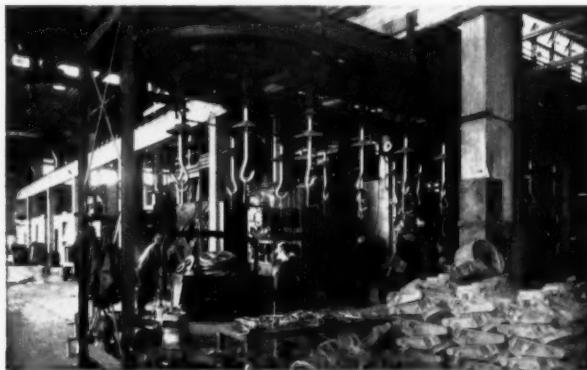
WHEELABRATOR[®]
STEEL SHOT
cuts abrasive costs for
ALL TYPES
of foundries

STEEL JOBBING
FOUNDRY
saves \$8,000 a year

Tests made in a 3-wheel Wheelabrator Monorail Cabinet at Crucible Steel Castings Co. showed these results: In 322 hours, the 3 wheels consumed more than 19,000 lbs. of the ordinary abrasive that had been used. Abrasive cost averaged \$1.578 per wheel hour for each wheel. In 202 hours, the machine used approximately 6,800 lbs. of Wheelabrator Steel Shot. Average abrasive cost was \$1.215 per hour for each wheel. The Milwaukee steel foundry operates 10 wheels a total of 100 hours each day, so daily abrasive savings add up to \$36.30, or about \$8,000 a year.

Similar tests by other foundries have shown similar results — some making even more than the 23% savings registered by Crucible Steel Castings Co. Wheelabrator Steel Shot has brought abrasive savings and reduction in parts wear and maintenance expense to all types of foundries — steel, gray iron, malleable, large, small, jobbing, production, etc. Why don't you save with this versatile abrasive, too?

The findings reported above resulted from tests conducted in the Wheelabrator Monorail Cabinet shown below.



**23% ABRASIVE
 COST REDUCTION
 ON STEEL CASTINGS**

**COST OF
 WHEELABRATOR
 STEEL SHOT**

**COST OF
 ORDINARY
 ABRASIVE**



WHEELABRATOR
 CORPORATION

510 South Byrkit Street, Mishawaka, Indiana

Write today for your free copy of Bulletin 89-B for more information on Wheelabrator Steel Shot.

Integral Flow Control Now Available In Larger Volume Vickers Vane Pumps

For power steering of vehicles with
very heavy front axle loading

Assures Optimum Steering ... Simplifies and Reduces Cost of Installation

Flow control in hydraulic power steering circuits is necessary because power steering pumps vary in volume delivery according to engine speed. To assure adequate steering power while maneuvering in tight places, the pump must be chosen to provide ample volume at engine idle speed. The much greater flow at high speed, if not controlled, results in unsatisfactory and sometimes unstable steering performance. Further disadvantage is undue heating of the hydraulic fluid.



FIG. 1—Vickers Series V200 Vane Pump with integral flow control and relief valve. Available in 3 sizes with nominal rated capacities of 5, 8 and 11 gpm.* Controlled flow rates of all sizes are 2, 4, 6 and 7 gpm at relief valve setting of 750 or 1000 psi.

*Rating at 1200 rpm.

An integral flow control valve for limiting flow to the steering device has always been a feature of the small Vickers Vane Type Pumps used in passenger car steering. Excess fluid resulting from higher engine speeds is returned to the reservoir with minimum pressure loss and very little heating. Previously, the larger pumps used for steering heavy vehicles did not have an integral flow control valve. It was installed as a separate unit.

Now Vickers offers larger pumps—the V200 Series—with integral flow control (See Fig. 1), which simplifies and substantially reduces the cost of installation. Smaller hydraulic lines to the steering booster are made possible by limiting flow in this part of the circuit.

For applications requiring two

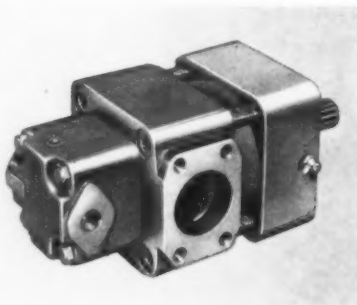


FIG. 2—Vickers Double Pump for operating two independent hydraulic circuits from one power source. Series V2200, V3200 and V4200 are available with the smaller pump (Series V200) having integral flow control for power steering.

separate hydraulic circuits, the Vickers line now includes three new

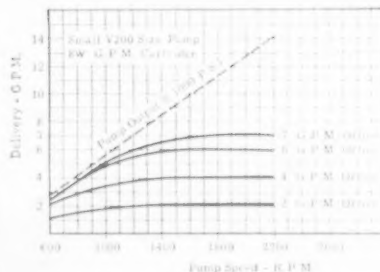


FIG. 3—Typical performance curves of Vickers V200 Pump with Integral Flow Control and 8 gpm cartridge. Delivery rises quickly with speed and then holds at controlled flow rate setting.

loads, provides longer life and reduced maintenance. Automatic wear compensation maintains "new-pump" efficiency throughout a very long life. Starting in cold weather is easier.

More Vickers designed pumps than all other makes combined are used for hydraulic power steering. Ask for new installation drawings M192680, M192856, M192857, M192858 and #1617-S.

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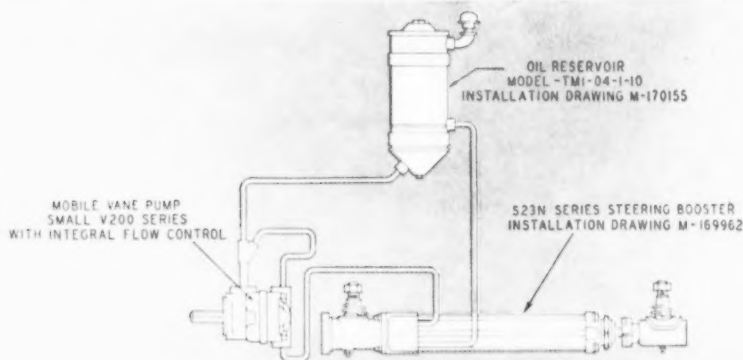


FIG. 4—Preferred circuit when using Vickers Series V200 Vane Pump with integral flow control and Vickers S23N Hydraulic Power Steering Booster. This model is without relief valve because the pump contains such a valve.

series of double pumps (See Fig. 2). Integral flow control is furnished in the small-volume section used for power steering. The large-volume section, in conjunction with Vickers multiple unit valves is used for operating the vehicle's tools.

Both the single and double pumps with integral flow control have all the features and characteristics responsible for the outstanding popularity of Vickers Vane Type Pumps. Higher efficiency means more work from less power. Hydraulic balance eliminates pressure induced bearing

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DIVISION OF SPERRY RAND CORPORATION

Mobile Hydraulics Division

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STAINLESS STEEL MAKES THE DIFFERENCE

...its effect on car
sales and resales

Nothing sells and satisfies like quality. Stainless steel provides proof of quality in a way the buying public can easily understand.

Consumers know from experience that stainless steel means rust resistance . . . strength . . . freedom from scratches and dents. They *know* it stays bright without polishing.

That's why stainless steel carries so much selling power in the showroom and even more on the used car lot.

For more facts about stainless steel see your supplier or write: ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

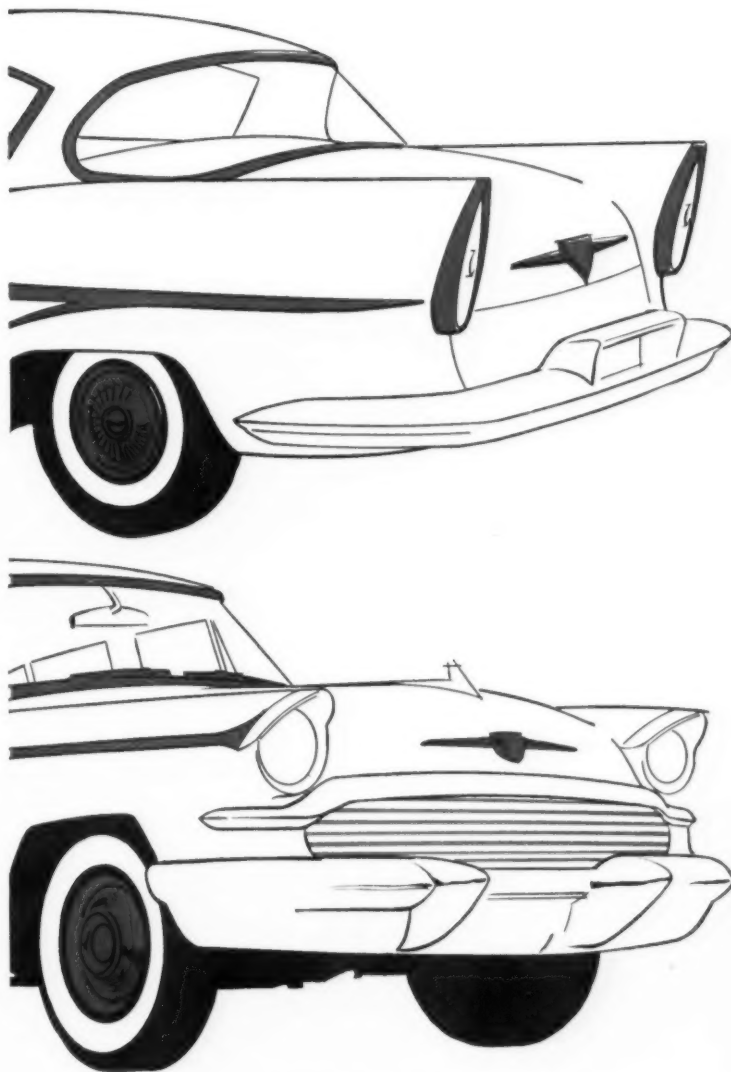
METALS DO MORE ALL THE TIME
... THANKS TO ALLOYS

Electromet
FERRO-ALLOYS AND METALS



The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

THE IRON AGE, September 19, 1957



Stainless steel styling is easiest of all to sell! Body and window mouldings, wheel covers, grilles, door handles and even roofs are stainless steel this year!



"Gadgeteering" Kissin' Kin to **AUTOMATION**

Webster defines our slang expression "a gadget" as "a device for doing something; especially, a part of machinery." It's kissin' kin to automation.

Many of the marvels in America's production lines are "gadgets" dreamed up by men tired of doing things the hard, slow way.

We manufacture air-powered work units to make the job of the methods engineer easier. With these integrally controlled power units

he can eliminate many cams, gears, levers and mechanical linkages and perform an almost unlimited range of repetitive pull, push or lift motions, smoothly, economically, and in perfect synchronization with any related movement. With them he can convert existing machinery into faster, automatic units, or he can build in his own tool room low cost, highly efficient special purpose machines.



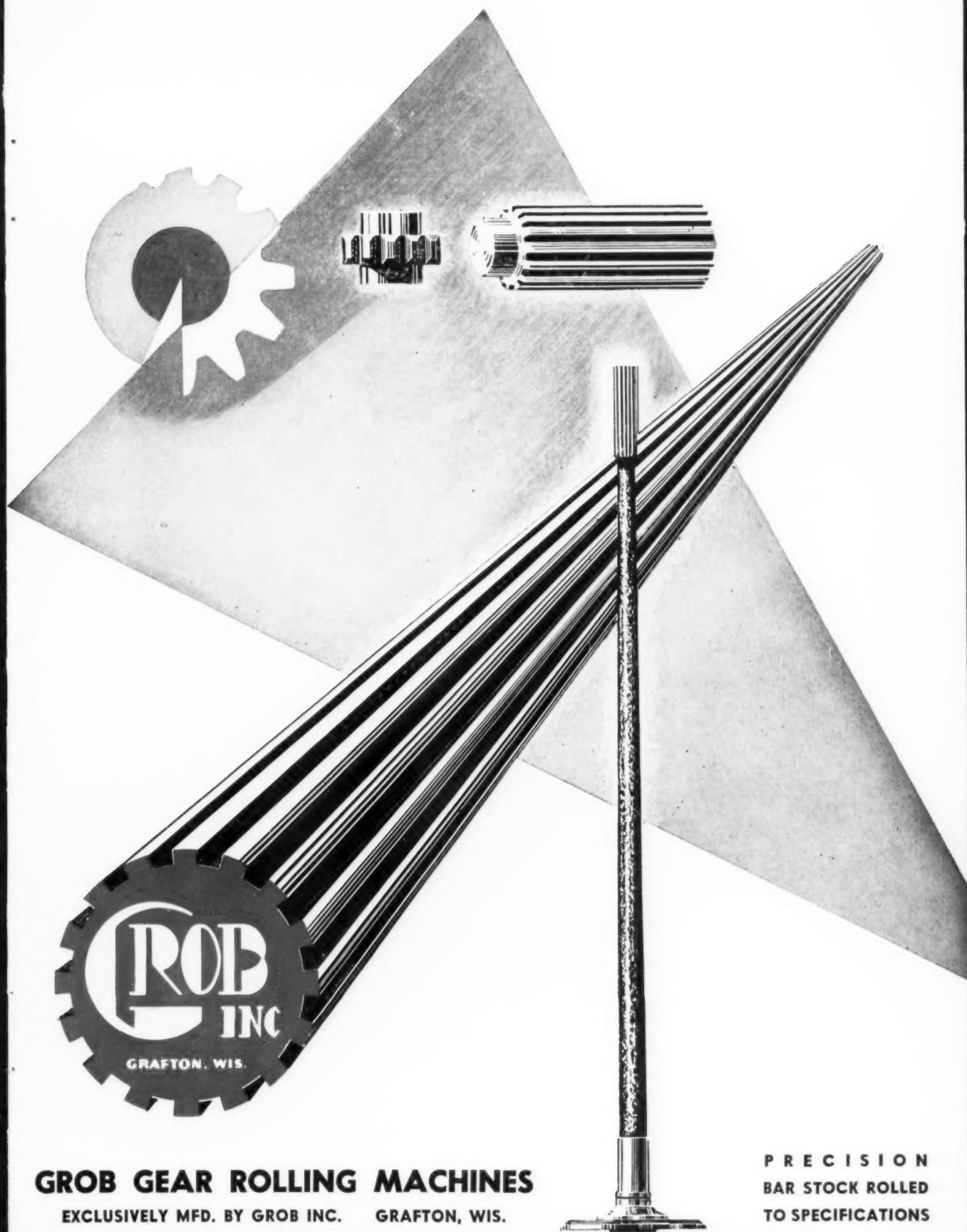
Like to know more?

These free four-color booklets will give you a quick picture of what Bellows "Controlled-Air-Power" work units can do for you. Ask for Bulletins BM-25 and ML-3. Address: Dept. 1A-957, The Bellows Co., Akron 9, Ohio. In Canada, Bellows Pneumatic Devices of Canada, Ltd., Toronto, Ontario.

The Bellows Co.
AKRON 9, OHIO

MANUFACTURERS OF "CONTROLLED-AIR-POWER"
DEVICES FOR FASTER, SAFER, BETTER PRODUCTION

766B



GROB GEAR ROLLING MACHINES

EXCLUSIVELY MFD. BY GROB INC. GRAFTON, WIS.

PRECISION
BAR STOCK ROLLED
TO SPECIFICATIONS

... AN 8 TO ONE SAVING WITH

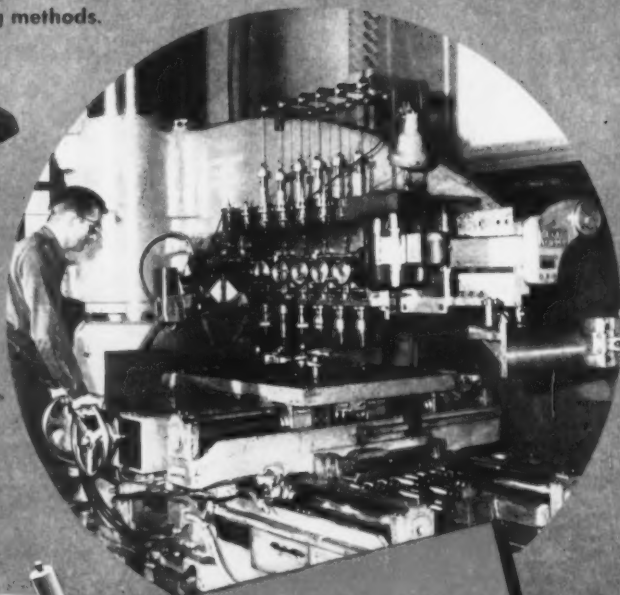
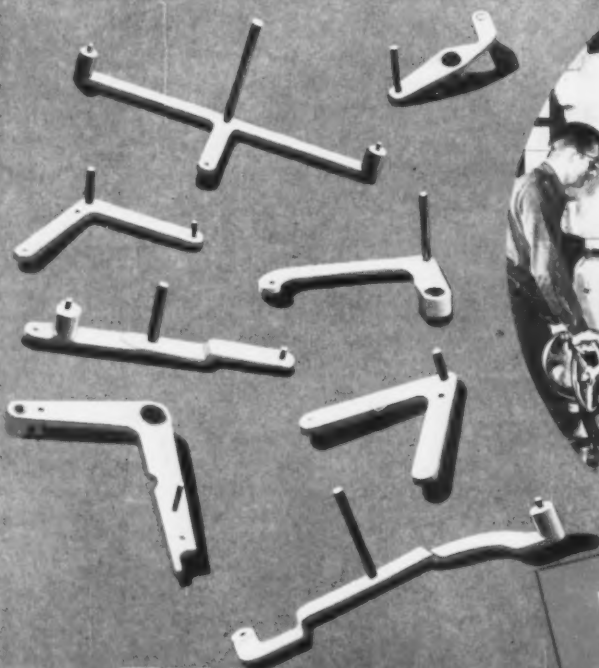
BULLARD *Spacer Table*

is obtained by the Daystrom Instrument,
Division of Daystrom Incorporated, Archbald, Pa.,
on drilling and boring various sized holes with diameter
tolerances of $\pm .0002$ and center distances of $\pm .0005$.

The major part of this saving is due to eliminating the necessity of making
costly drill jigs and boring fixtures for each individual piece or operation.

The multiple drill head, with variable speed drive, at Daystrom
Instrument, is set up to drill and bore three different diameters
on as many as fourteen holes in one set-up.

The versatility and accuracy of the Bullard Spacer Table
can be applied to your manufacturing methods.



Remember . . .
to cut costs
when cutting metal —
buy BULLARD

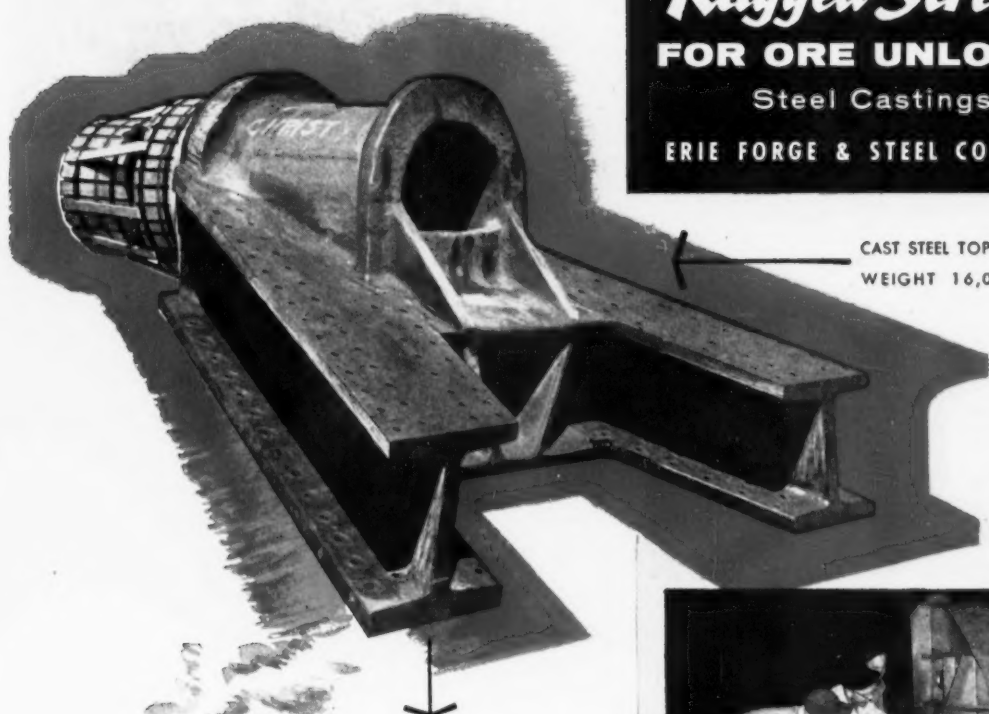
THE BULLARD COMPANY

BRIDGEPORT 9, CONNECTICUT

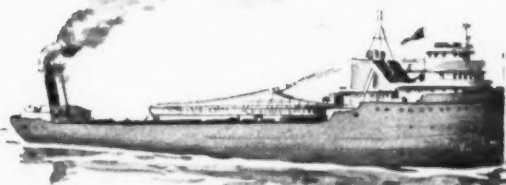
Rugged Strength- FOR ORE UNLOADERS

Steel Castings by:

ERIE FORGE & STEEL CORPORATION



CAST STEEL TOP PIVOT TRIPOD.
WEIGHT 16,010 POUNDS.



COMPLETED VESSEL

Typical of Erie Forge & Steel Corporation's versatility in making steel castings from raw material to finished product are these weighty ship's unloader components for ore carrier fleets plying the Great Lakes. Unloading iron ore cargoes is a rough job. The equipment to do it demands quality steel castings with the cast-in strength and "staying power" to handle the heavy ore with speed and utmost dependability. No ordinary steel casting will do the job. Quality control from raw material selection, to furnace, to mold and through machine shop, step by step, results in components which prove their high value every day in ore transportation from range to dock-side destination. You can be sure of steel castings, produced "Under One Responsibility and One Control", which will do a lot more than just "meet" your requirements when you deal with us. Your Erie Forge & Steel field man will be seeing you shortly.



CAST STEEL EYE BAR PIVOT. WEIGHT 8,830 POUNDS.



CAST STEEL BASE PIVOT. WEIGHT 25,660 POUNDS.

*PHOTOS COURTESY OF CHRISTY CORPORATION, STURGEON BAY, WIS.



ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

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Faster... More Powerful

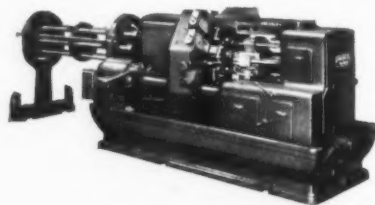


AUTOMATIC BAR MACHINES

HELP YOU BEAT RISING PRODUCTION COSTS

The cowman achieves speed and power in a good "using" horse by years of careful breeding . . . Greenlee develops these same qualities in its Bar Automatics by continuous research and design improvement. One of the many superiorities of this speed and power is that it enables you to take full advantage of modern tooling practices. Your Greenlee representative will be glad to show you how it is done. Please submit print when inquiring about a specific job.

Write for Catalog No. A-405



SIX AND FOUR-SPINDLE AUTOMATIC BAR MACHINES

GREENLEE Special Machine Tools

- Multiple-Spindle Drilling and Tapping Machines
- Transfer-Type Processing Machines
- Hydro-Borer Precision Boring Machines

GREENLEE
BROS. & CO.

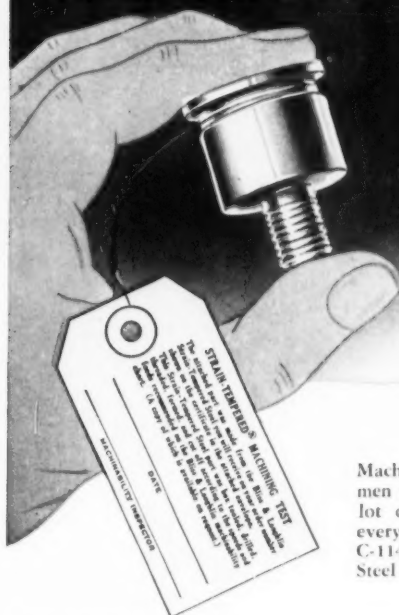
**1809 MASON AVE.
ROCKFORD, ILL.**

This is your assurance
of Top Quality

when you specify



Strain-TEMPERED
BAR STEELS



Machinability Test Specimen machined from your lot of steel goes with every order of B&L C-1144 Strain Tempered Steel

Here's why *better production* goes with *cost reduction*, when you rely on Strain Tempered* Bars of Certified Quality and Tested Machinability:—

1. Strain Tempered* bars provide high physical properties that save you costly additional heat treating, cleaning, and straightening operations.
2. When replacing Alloy steels, Strain Tempered bars provide you with substantial economies in machining time and tool wear.
3. Strain Tempered bars possess wearability qualities comparable to those found in more costly steels where these qualities are obtained only by additional heat treatments.
4. Minimum distortion and freedom from warpage during machining operations are further money-saving features of Strain Tempered Steels.

*Trade-Mark Registered.

Write for new Brochure No. 58

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GENERAL OFFICES: HARVEY, ILLINOIS

FOUR PLANTS:—



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DETROIT, MICH.



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MANSFIELD, MASS.

THE IRON AGE, September 19, 1957

CERTIFIED REPORT
Chemical and Physical Properties
STRAIN TEMPERED

P.O. _____ DATE _____
CUSTOMER _____ B&L NO. _____ GRADE _____
SIZE _____ COND. _____
COLOR MARKING _____ CAR NUMBER _____
DATE SHIPPED _____
NOTES: _____

Heat	Tensile Strength	Yield Point	% Elong. In. _____	% Red. Area In. _____ Dia. _____

Chemical Composition

Heat	C	Mn	P	S	Si

Bliss & Laughlin, Inc., Harvey, Ill., Buffalo

Notarized Certificate of physical properties and chemical analysis mailed to you together with machined test part . . . a New Service for Bliss & Laughlin customers.

SALES OFFICES
IN ALL PRINCIPAL CITIES

What happened to the price of oxygen?

The price of bulk oxygen has dropped about 80% in 12 years, while most other prices have risen. Oxygen is now being produced in large quantities for a few pennies per 100 cubic feet.

Oxygen isn't the high-priced chemical it used to be. Now, it's a low-priced tonnage commodity—a utility purchased like electricity or water. The price drop is the *real reason* oxygen usage has climbed beyond 70 billion cubic feet per year.

Why was it costly?

Transportation costs, storage, outside labor involvements and the other limitations of outside supply added expense and uncertainty to hauled-in-oxygen. Trucks and tank cars are still in use, but today's major savings result from Air Products *on-location* generation.

Air Products reduced the cost

In 1940, Air Products developed oxygen generators which could be installed right in an industrial plant to meet any oxygen need, safely and economically. With generators built, operated and maintained by Air Products, industry could now have its own on-site supply of oxygen at a guaranteed price . . . without investing one cent of capital.

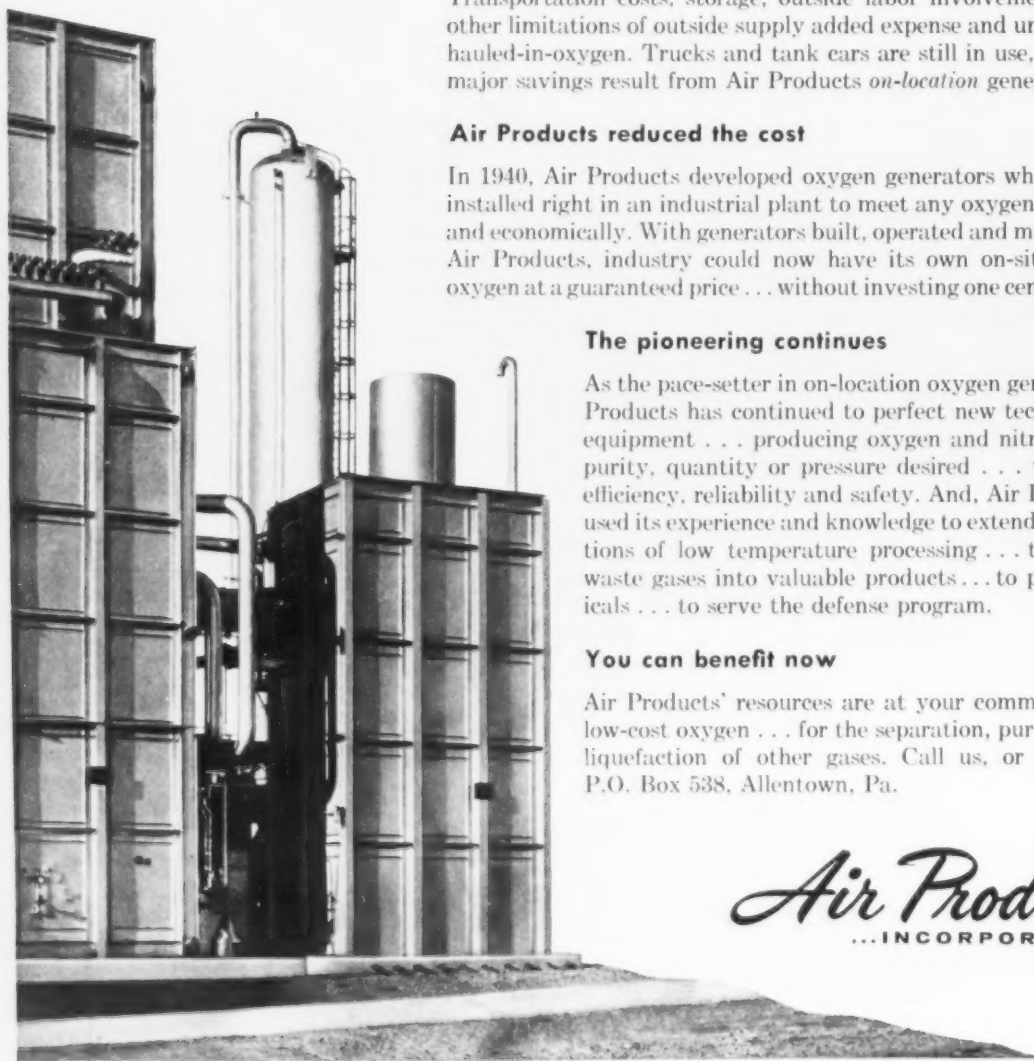
The pioneering continues

As the pace-setter in on-location oxygen generation, Air Products has continued to perfect new techniques and equipment . . . producing oxygen and nitrogen in any purity, quantity or pressure desired . . . with greater efficiency, reliability and safety. And, Air Products has used its experience and knowledge to extend the applications of low temperature processing . . . to transform waste gases into valuable products . . . to purify chemicals . . . to serve the defense program.

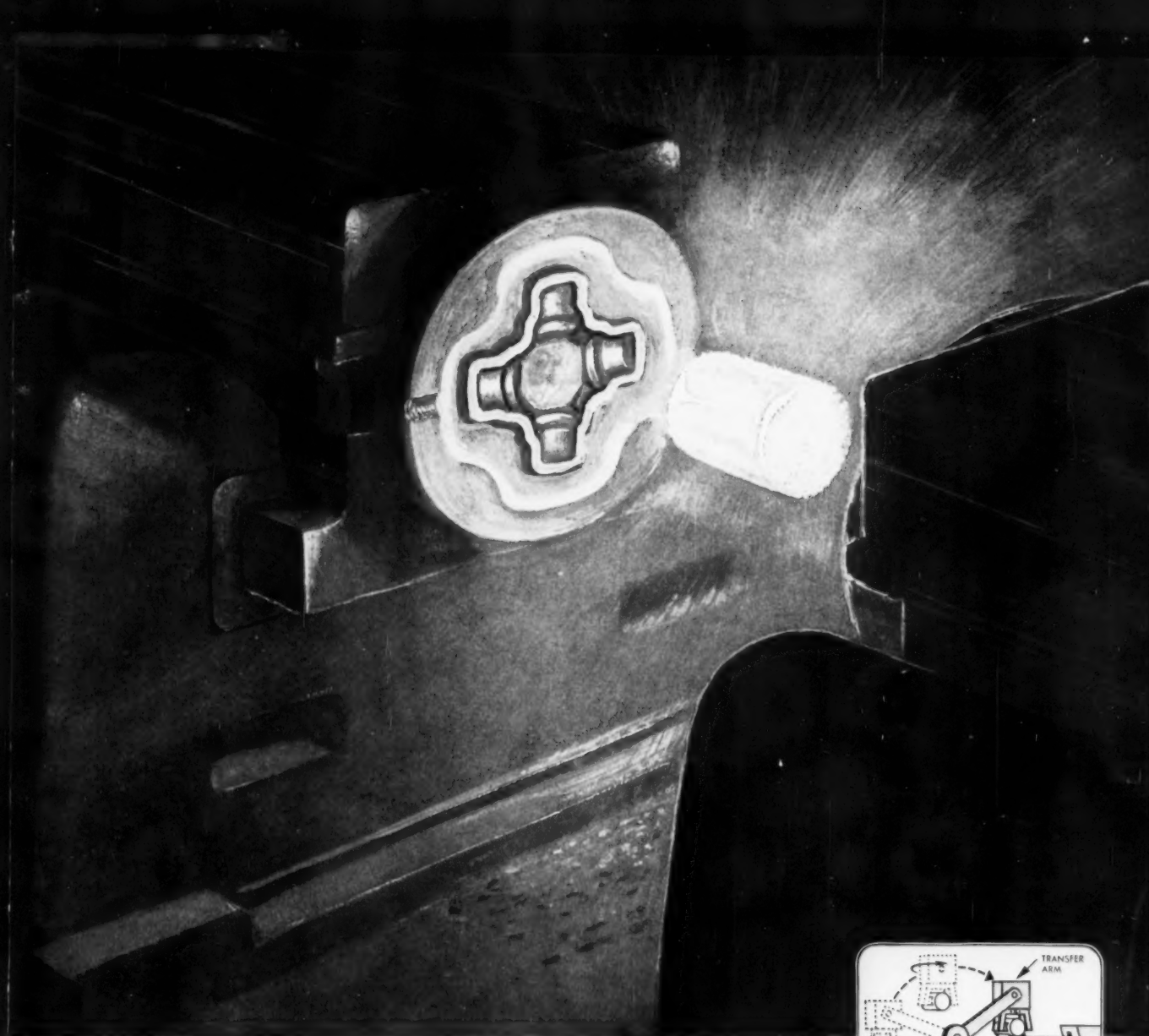
You can benefit now

Air Products' resources are at your command . . . for low-cost oxygen . . . for the separation, purification and liquefaction of other gases. Call us, or write us at P.O. Box 538, Allentown, Pa.

Air Products
...INCORPORATED



Hundreds of Air Products package generators and tonnage plants are now on stream . . . capacities range from 216,000 cu. ft. per month to 360,000,000 cu. ft. per month.



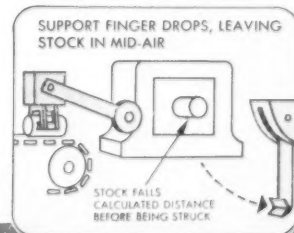
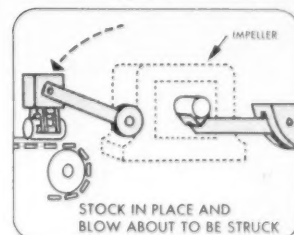
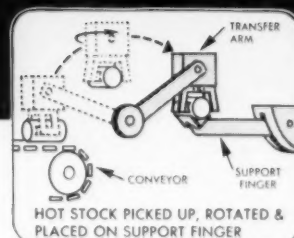
FORGING IN MID-AIR . . . without grips . . . without sprues . . . without shock or vibration, *in a completely automatic operation!* This is but one of the possibilities in Cecomatic Forging based on the revolutionary Chambersburg Impacter and utilizing the Cecomatic Gravity Feed. Investigate the potentialities of the Cecomatic Process for forging production in varying degrees of automation. Write or phone us.

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.

Shockless, vibrationless forging



in the IMPACTER is the basis of



THE CECOMATIC FORGING PROCESS



***Would you substitute price
for dependability?***

There is no substitute for dependability when choosing a producer of stainless steel.

Requirements are becoming more and more critical every day. Meticulous attention to every detail of pro-

duction is essential. There can be no short-cuts.

You can depend on Carlson to produce the highest quality stainless steel plate; to maintain large stocks of finished plate and heads; and to continue a long record of efficient service.

Most of all, you can rely on our established policy of delivering the highest quality stainless steel at competitive prices. And we never make special arrangements that deviate from this policy.

G.O. CARLSON *Inc.*

Stainless Steels Exclusively

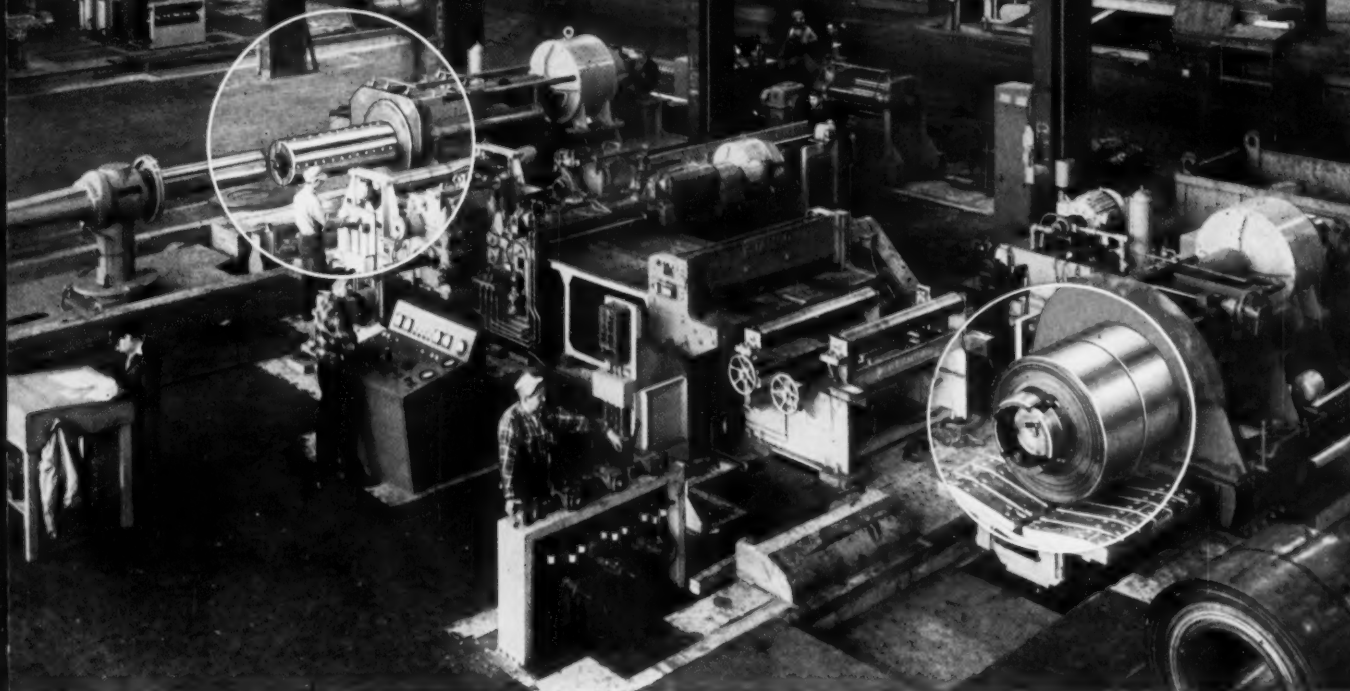
THORNDALE, PENNSYLVANIA



PLATES • PLATE PRODUCTS • HEADS • RINGS • CIRCLES • FLANGES • FORGINGS • BARS and SHEETS (No. 1 Finish)

**WHAT TO
LOOK FOR IN . . .**

**SHEET & STRIP
EQUIPMENT**



there's a DIFFERENCE IN REELS

Balanced Drum Segments, interlocked and chrome plated to prevent scoring of drum.

Shafts mounted in anti-friction bearings with ample thrust and radial load capacity.

Hydraulic traversing and elevating coil carriage.

Coil Stripping Device (Tension Reel) prevents telescoping of coil.

OPERATOR EASE: Adequate drum expansion permits loading or unloading coils easily. Hydraulically operated strip aligner permits 6" movement either side of center line of line. Automatic Gripper Bar on Tension Reel grips strip from minimum to maximum without adjusting. Suitable for either over or underwinding of strip. On Payoff Reel, patented coil centering by adjustable stop plate supported by two

round steel racks . . . easily adjusted with handwheel. Indicator gives operator a clear view of strip width.

EASY MAINTENANCE: Oil Seals of special split design for drive housing; circulating oil system for drive with separate motor drive. Balance of unit easily serviced by accessible fittings or centralized lubrication system.

GOOD DESIGN: 4-segment Drum provides more contact with coil I.D. The Tension Reel starts winding any coil in an almost perfect circle. Aetna's design of reels puts minimum unit pressure on sliding shoes when full weight of coil is on the drum.

RUGGEDNESS: Helical Gear Drive—quiet and smooth, strong, less weight; heavy structural steel weldment with machined ways provides a rugged strong base for high speeds without vibration.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

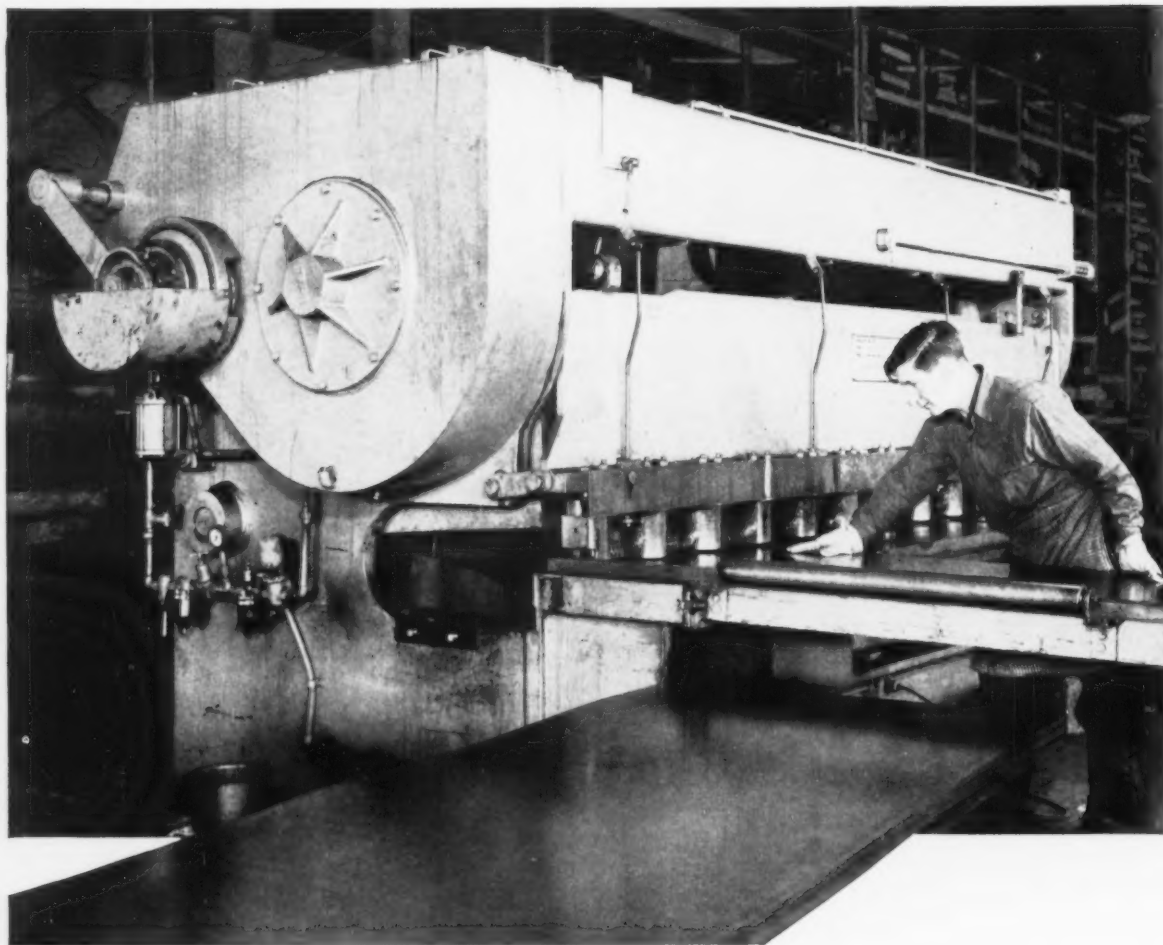
GENERAL OFFICES: PITTSBURGH, PA.

PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

.002 inch clearance between knives produces sharp, straight, accurate edges in the 18 gauge metal cut on this Steelweld Shear. The clear-

ance is easily increased to suit heavier metal. The shear operator is not confined to some average compromise clearance.



Cuts 1200 PIECES Per Hour

Farm Equipment Manufacturer Gets Sharp, Accurate Cuts
Because of Steelweld's Exclusive Knife Clearance Adjustment

MASSEY-HARRIS-FERGUSON, Ltd., Toronto, well known throughout the world as a leading manufacturer of farm implements does much of the cutting required for the various steel parts with Steelweld Shears.

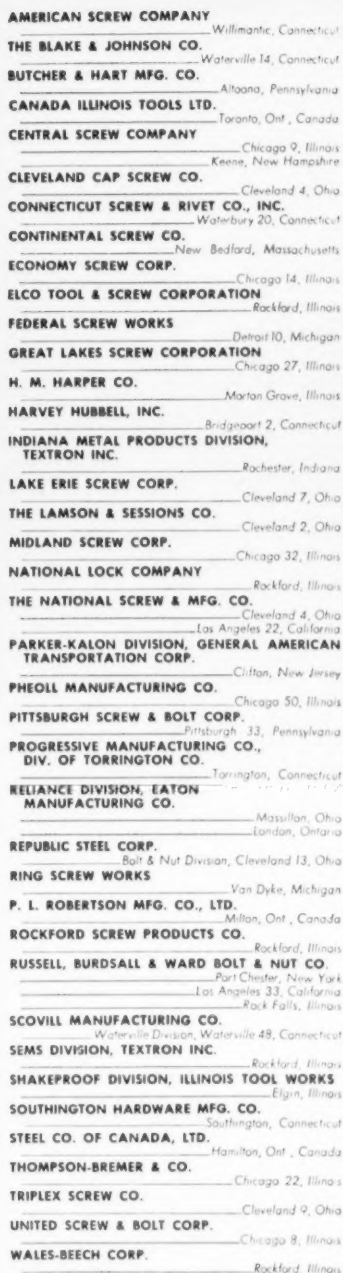
Massey-Harris-Ferguson obtains the best possible cuts because the knife clearance can be adjusted exactly to suit the thickness of metal being cut. It is not necessary to depend upon some compromise difficult-to-change knife setting with Steelweld Shears, as they are easily adjusted to the correct clearance in 10 seconds.

Write for free copy of Catalog No. 2011
Gives construction and engineering details

Illustrated is one of the many cutting jobs for which Steelwelds are used. 108-inch lengths of 18 gauge steel are cut into six 18-inch pieces at a rate of 1200 per hour. Knife clearance setting for this work is .002 inch. This shear has been in operation 24 hours a day, six days a week, for many years.

STEELWELD
PIVOTED
BLADE **SHEARS**

STEELWELD DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4856 E. 282 ST. • WICKLIFFE, OHIO



a first step in mass-assembly savings

Sems

pre-assembled screw and lock washer

Pre-assembled SEMS save separate washer handling, save lost or forgotten washers, save rejects due to mis-matched screw and washer. Can be hopper fed for automatic driving. Available in many types and varieties.

Specify **SHAKEPROOF®** Lock Washers when ordering SEMS. Designed for a perfect match, they lock tight, stay tight, guard against loosening vibration.



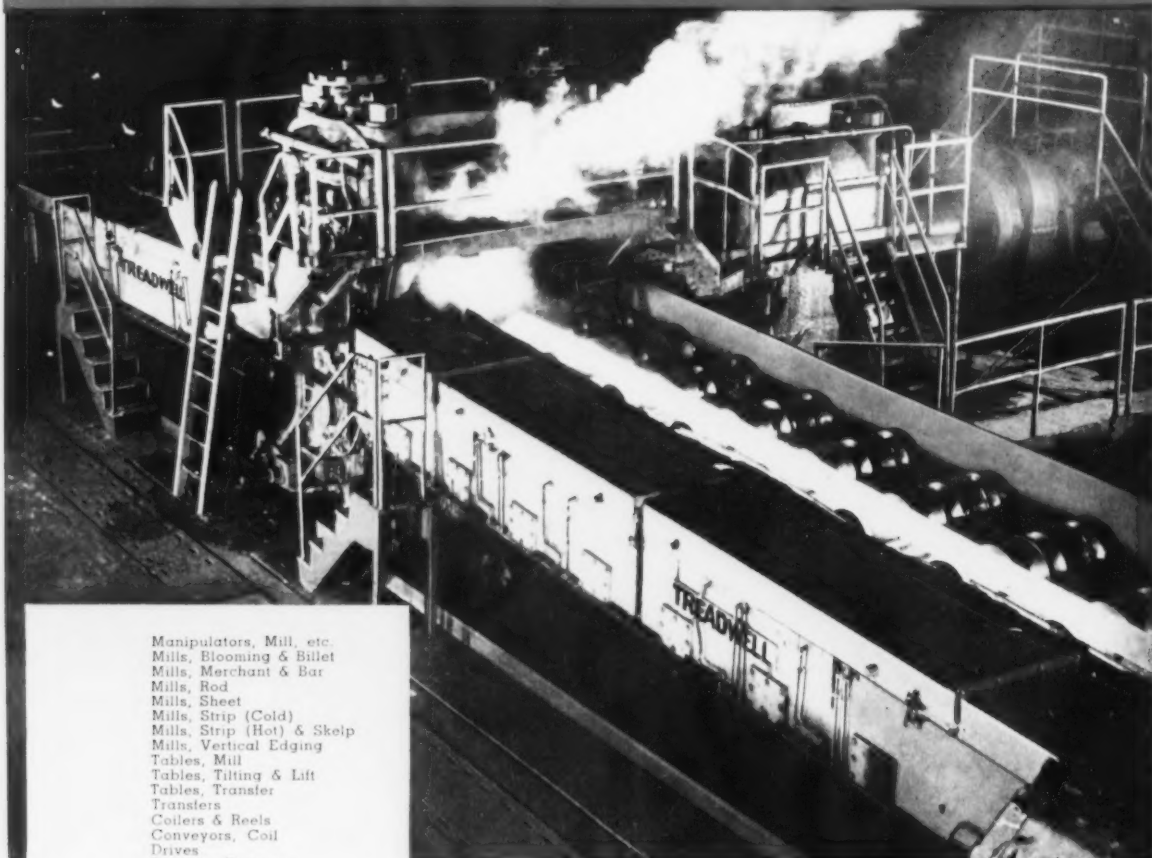
SEMS is a development of Illinois Tool Works, Chicago



39 Sources

CONVENIENTLY LOCATED FOR FAST SERVICE

Treadwell



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Mills, Merchant & Bar
Mills, Rod
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Tables, Transfer
Transferers
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offs, Pilers, Cradles, etc.)
Steel and Iron Castings
Ni-Hard and Ductile Iron
Castings

Photograph Courtesy Jones & Laughlin Steel Corp.

40' long 28" three-hi mill tilting tables for diamond and square pass rolling of bars, billets and blooms. Materials automatically manipulated from pass to pass with manipulators. Our Engineers will be glad to discuss your mill problems with you.



Treadwell Engineering Company

EASTON, PA.

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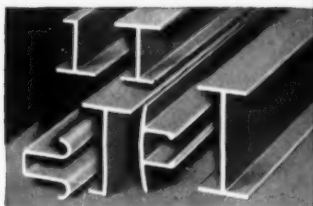
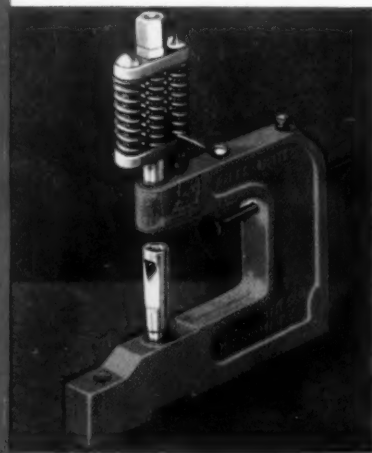
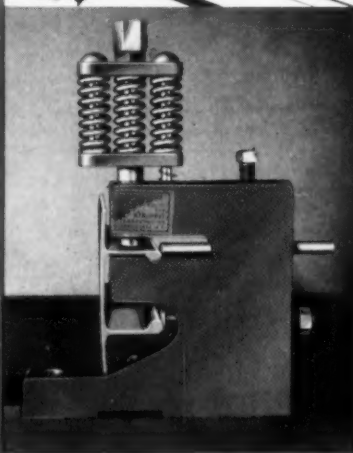
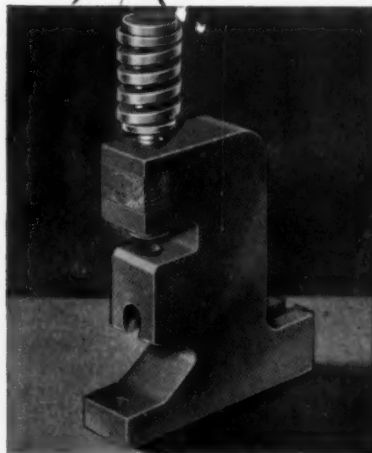
**1015 FARMERS BANK BLDG.
PITTSBURGH 22, PA.
ATlantic 1-2883**



SAVE OVER 50%

PUNCHING HOLES IN EXTRUSIONS SHAPES AND ANGLES!

WALES "C-E" TYPE SELF-CONTAINED TOOLING



A few of the many shapes and extrusions punched with WALES C-E units.

Hole punching of formed and extruded shapes, is a simple operation with WALES self-contained C-E type tooling. Punch, die and stripping mechanism are all integral parts of the unit. Alignment is automatic! The same tooling may be used in any pattern and the set-up is FAST. A wide variety of units is available to fit almost every hole punching need. WALES C-E type tooling is a must for economy minded shops.

SEND FOR BULLETIN No. 14 H

Specifications, illustrations
and data to help you solve
the toughest hole
punching problems.



WALES *Strippit* COMPANY

A UNIT OF HOUDAILLE INDUSTRIES, INC.

AKRON, NEW YORK

WALES-STRIPPIT OF CALIF., SOUTH GATE, CALIF.

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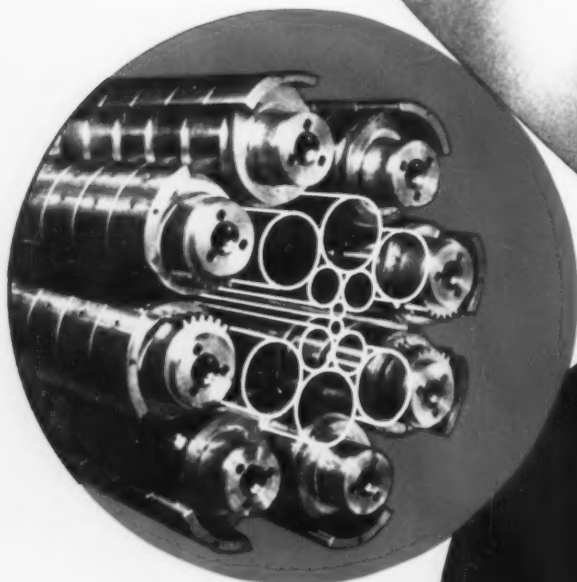
"...the Wales-Way is the PLUS-PROFIT way"

WALES MOBILE FIELD UNITS



See this demonstration shop
on wheels. We can arrange
to have it show you
right at your door.
Ask for details.

This **80" WATERBURY FARREL
SENDZIMIR MILL**
*maintains precise gauge across the width
and along length of strip*



Phantom view of roll arrangement

**CONSIDER THE ADVANTAGES OF
THE SENDZIMIR COLD MILL**

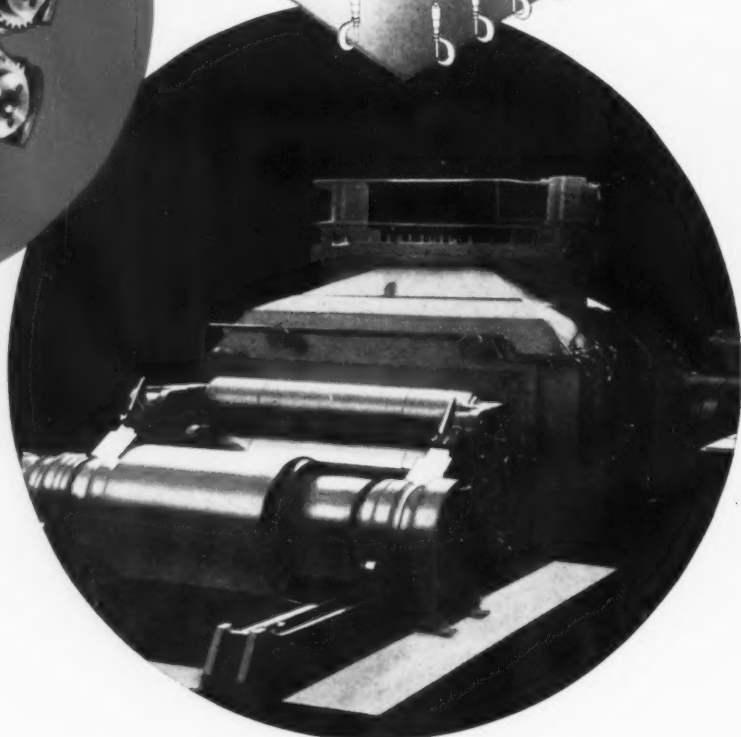
- Extreme Accuracy In Gauge,
Due To Uniform Support
Throughout Mill
- Elimination Of Intermediate
Anneals
- Greater Reductions Per Pass
- Highest Surface Finish
- Quick And Simple Roll Changes
- Low Initial And Maintenance
Costs

SENDZIMIR MILLS
ARE ENGINEERED AND BUILT BY
**THE WATERBURY FARREL
FOUNDRY & MACHINE CO.**

Waterbury, Conn.—U. S. A.

SALES OFFICES: Chicago • Cleveland • Millburn, N. J.

FOREIGN: SENDZIMIR Ltd., 75 Grosvenor St., London W1, England
PROCEDES SENDZIMIR S.A.R.L. 73 Blvd. Malesherbes, Paris 8, Fr.



This Sendzimir cold strip mill rolls 80" wide low carbon steel from hot rolled thickness to .024" with total gauge variation of .0004". Similar uniformity is being regularly obtained on Sendzimir cold strip mills rolling brass, copper, aluminum, stainless steel, silicon steel, etc.

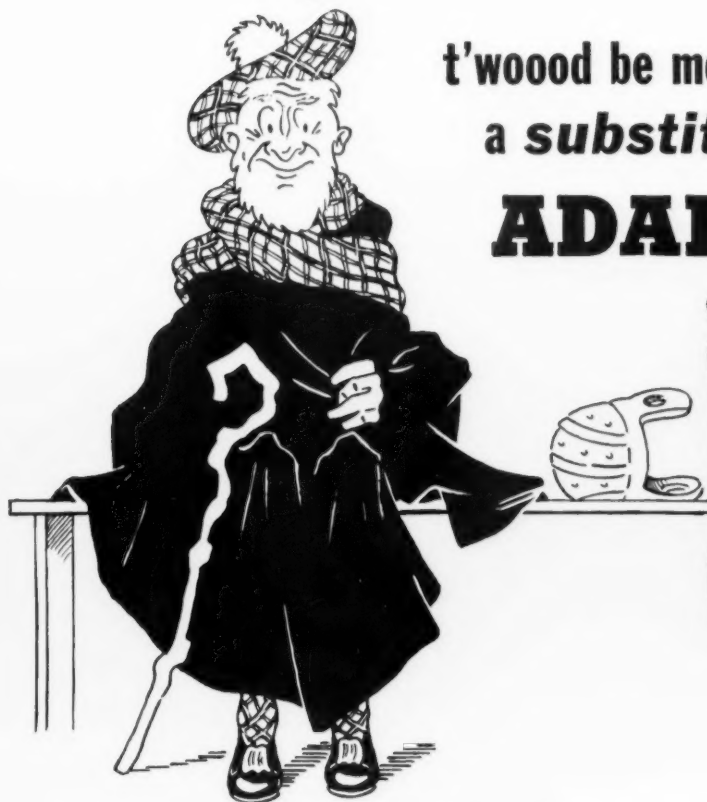


Backing Roll Support



Sendzimir Support

Hoots Mon!



t'wood be money-wastin to accept
a *substitoooot* for famous
ADAHEARTH



"... ye canna' beat ADAHEARTH as a superior, longer lastin' refractory for forming monolithic hearths... 'tis a chemically neutral, chrome base refractory with a plastic consistency... has unusually strong air-set; resists spalling, molten metal, and abrasion; has low porosity, high density, absolute homogeneity of structure... ADAHEARTH requires fewer man-hours to install... insures cleaner forgings and a faster-working furnace... sheerer money-savin'!" says Scotty.

Write for detailed Bulletin... Yellow Pages of 'phone directory have your nearest "ADAMANT" Distributor.

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REFRACTORIES

ADAMANT and other ADA products

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Another plant tames sulphuric acid with *Carpenter* Stainless No. 20 and No. 20Cb

An automatic sulphuric acid dilution system, with Carpenter Stainless No. 20 and No. 20Cb preventing corrosion at critical points, is cutting acid costs and reducing dangerous acid handling for a Tennessee textile plant. Savings with the system in its first year of operation equaled the total initial cost. Carpenter No. 20 and No. 20Cb control corrosion attacks of H_2SO_4 concentrations up to 23% in a cutting tank (shown above), piping and pumps.

Whether you have sulphuric acid solutions or other strong corrosives to handle, see how Carpenter Stainless No. 20 and No. 20Cb can help you cut corrosion costs by keeping acid handling equipment on the line longer.



Write for a copy of the Carpenter Stainless No. 20 and No. 20Cb handbook containing physicals, corrosion resistance and fabrication data.

These super corrosion-resistant alloys are available in tubing, pipe, sheet, plate, bars, strip, wire and billets to meet your exact requirements.

See your nearest Carpenter Distributor for full information and help on your particular application for Carpenter Stainless No. 20 and No. 20Cb.

MEMBER



**The Carpenter Steel Company,
Alloy Tube Division, Union, N. J.**

Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"



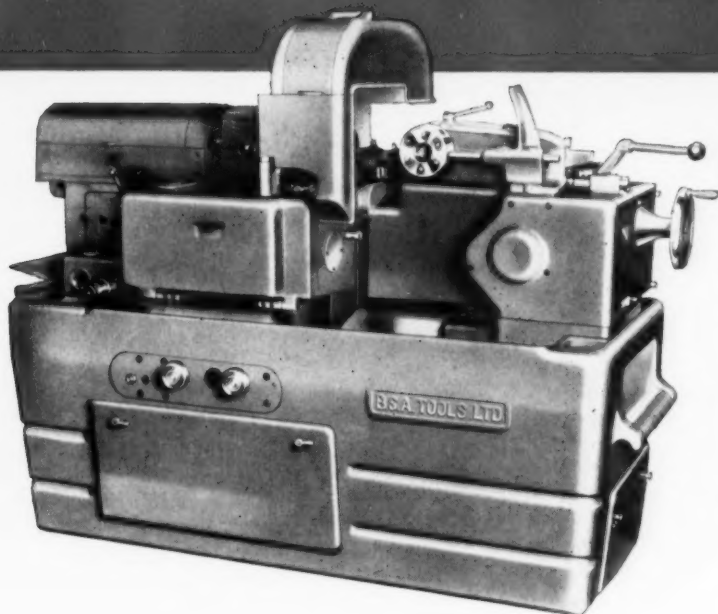

Stainless No. 20 & No. 20Cb

Carpenter No. 20 bars, strip, wire and billets are available also from The Carpenter Steel Company, Reading, Pa.

BSA

first to provide UNIT REPLACEMENT of parts subjected to most wear

to keep important production flowing with new machine performance



Additional Production Advantages of BSA

FIVE STANDARD CAPACITIES: $\frac{1}{4}$ " $\frac{3}{4}$ ", 1", 1 $\frac{1}{2}$ ", and 2".

WIDE RANGE OF SPINDLE SPEEDS—200 to 6000 on $\frac{1}{2}$ " machine, 69 to 1260 on 2" model.

Cams, change gears and tooling easily accessible FOR QUICK JOB-TO-JOB CHANGEOVER.

Unit construction provides quick access for EASY MAINTENANCE.

Special spindle mounting, DESIGNED TO REDUCE WEAR.

Positive chain drive from gear box to spindle PREVENTS SLIPPAGE.

All models use STANDARD AMERICAN TOOLING

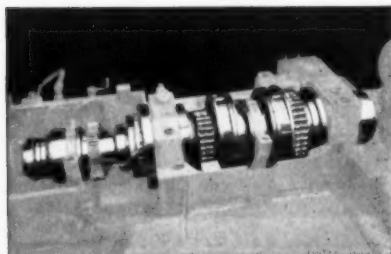
With speeds, machining accuracy, ease of tooling and operation and maintenance equal or superior to any machine in its classification, BSA Single Spindle Automatic Screw Machines offer a very definite plus value through "unit construction and replacement" of work spindles, side slides, turrets and gear boxes.

Unit construction, plus extremely rigid, one-piece machine frame makes it possible to bring BSA machines back to factory standards of perfection quickly. You place an important unit back in the line with a minimum of lost production.

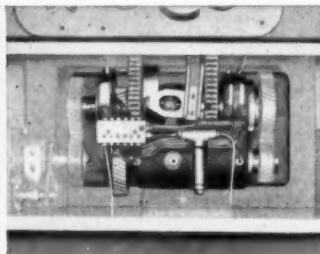
Shipment of replacement parts are speeded to you from National Acme, in Cleveland. Here, also, full engineering and design services as well as demonstration and service facilities, in the National Acme tradition, are available to you.

May we explain how "unit construction and replacement" can ease your production problems?

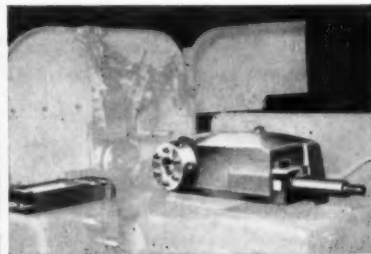
UNIT CONSTRUCTION SPEEDS REMOVAL OR REPLACEMENT



Work Spindle



Gear Box



Side Slides and Turret

Distributed and Serviced in U.S.A. by...

National Acme

THE NATIONAL ACME COMPANY, 175 E. 131ST ST., CLEVELAND 8, OHIO • Sales Offices: Newark 2, N. J., Chicago 6, Ill., Detroit 27, Mich.



Why designers specify FLEXLOC self-locking nuts

Where products must be tough . . . must stand up under vibration, shock and abuse . . . designers specify rugged, reliable, precision-built FLEXLOC self-locking nuts as fasteners.

HERE'S WHY:

FLEXLOC locknuts are strong: tensile strengths far exceed accepted standards. They are uniform: carefully manufactured to assure accurate, lasting spring tension in the flexible locking collars. And they are reusable: rough screw threads,

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Standard FLEXLOC self-locking locknuts are available in a wide range of standard sizes and materials, to meet the most critical locknut requirements. Your authorized industrial distributor stocks them. Write us for complete catalog and technical data. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

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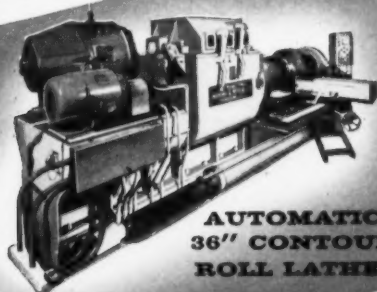
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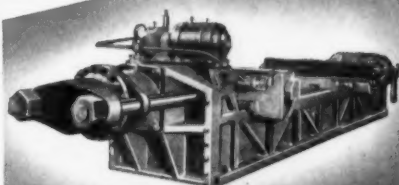
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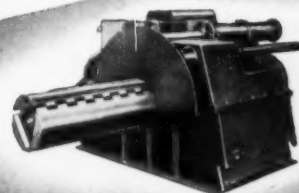


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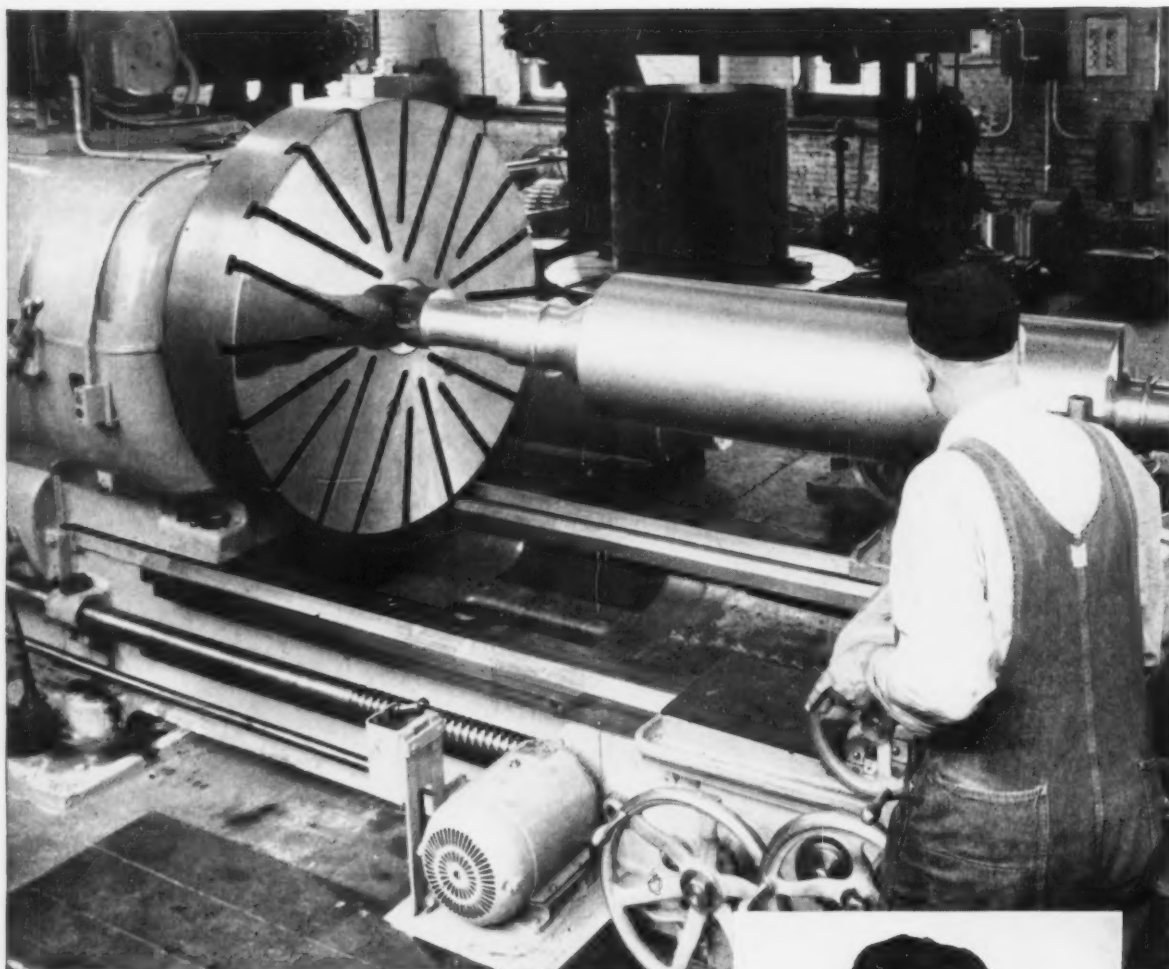
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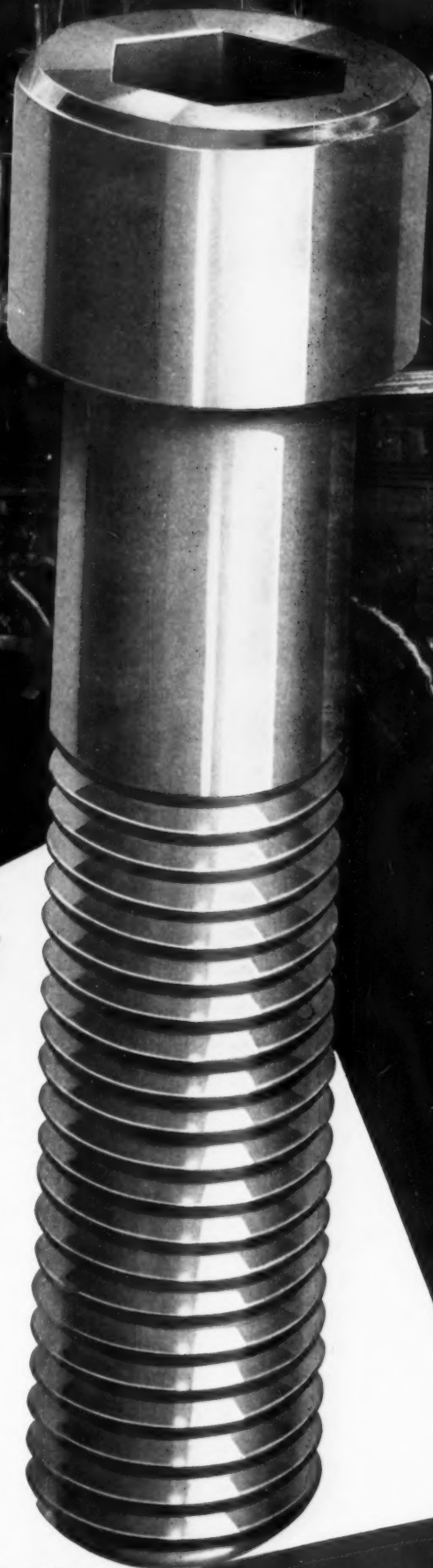
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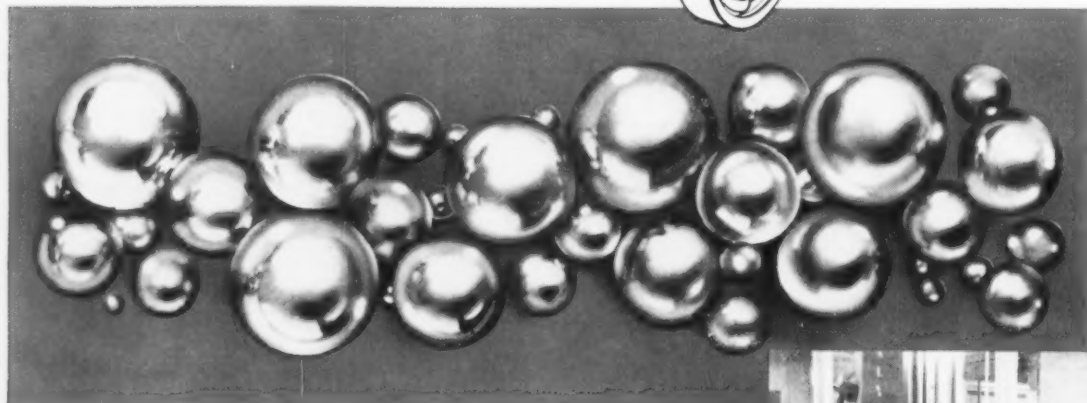


FACTS

about

NEW DEPARTURE

STEEL BALLS



Why Leading Manufacturers Choose New Departure Steel Balls

Prompt delivery . . . quality . . . and quantity . . . to fit your specifications! These are the major reasons why leading manufacturers choose New Departure to fill their steel ball needs.

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Watch Plate Demand

Several automotive-construction equipment producers are actually reducing their steel inventories and will continue to do so through October. In one case, a steel consumer will reach his lowest inventory point in four years during October. Cutback is due to some still fairly heavy inventories of finished goods. Management is demanding the reductions even though their own purchasing departments are advising against trimming too much.

To Go After Roofing

Producers of aluminum-coated sheet steel will make a stronger bid for the roofing market, particularly in rural areas. Several studies underway are aimed at boosting aluminized sheet in areas that are already prime markets for galvanized sheet in roofing applications. They'll offer stiffer competition for galvanized as early as next spring.

Guards Bulk Materials

A low-cost spray solution protects bulk materials stored outside. It forms a flexible, water-resistant film when exposed to air. It will coat piles of coal, ores, sulphur and other material regardless of composition or particle size.

Sound Cleaning

Major chemical producers are demonstrating their faith in the future growth of ultrasonic cleaning by launching compounds specially designed for ultrasonic units. Several firms will tailor the cleaning compound for a specific installation or application.

More Probes Coming

Look for more Congressional investigations in the months ahead. This is despite the fact that legislators have recessed until Jan. 7. Some 50 separate probes are coming between now and then. In the House, 35 different investigations are shaping up. In the Senate, 10 are either underway or in the planning stage. Some subjects due for airing: Steel prices (a continuation of the

Kefauver hearings started in August), small business problems, labor racketeering, and Red infiltration of U. S. industry.

Aids Small Firms

Small firms seeking defense contracts will soon get the data they need to make sound bids. Absence of detailed drawings and engineering data has hampered such companies in the past. After prodding by Congress, the Defense Dept. has set up this rule: Research and development contractors must make drawings of nonstandard components. Prospective bidders will have access to the drawings.

Rail Freight Rates

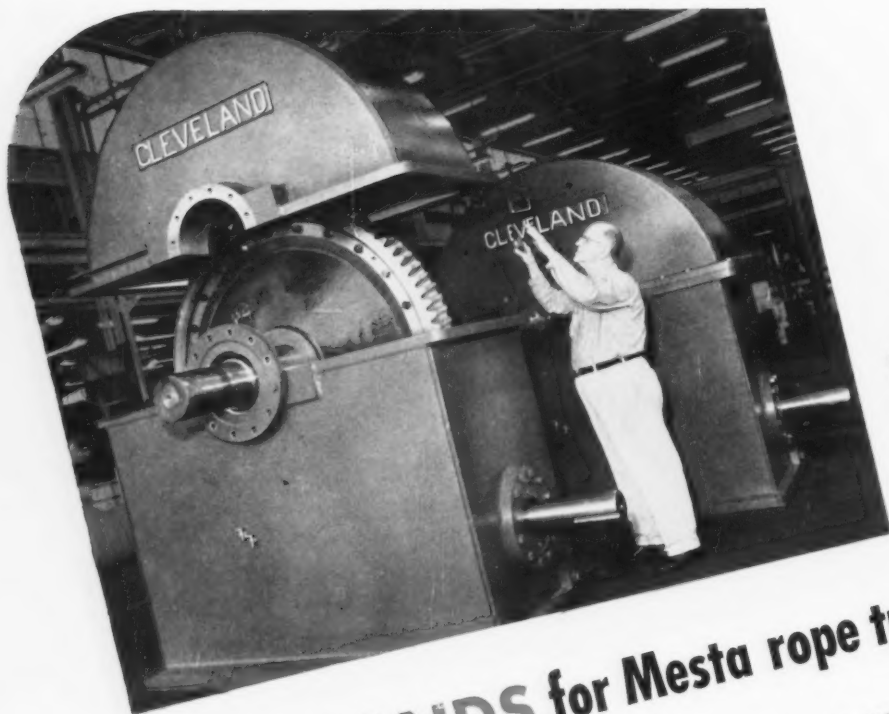
The railroads are planning to go after another freight rate boost. And they expect to find the ICC receptive. As it approved the latest rate rises, effective in August, ICC pointed out growing railroad costs. Among these are higher wages, beginning Nov. 1, and higher priced materials. Encouraged, the rail lines will seek the new increases, despite warnings that more traffic will be lost to other carriers.

Makes Ultra-Thin Steel

The West Germans have come up with a new process for making steel sheet and strip in thicknesses ranging from 0.5 mm all the way down to 0.02 mm. It's done galvanically by more or less plating the steel onto a moving metal strip in an acid bath. The steel film is then stripped off the band by special equipment. Even scrap can be used as raw material.

Protect From Molten Metal

A new method for protecting steel and cast iron parts against attack by liquid aluminum coats them with chromium boride. The coating on the surface prevents wetting, and has excellent oxidation resistance up to 1800°F. It can be used for protecting thermocouple tubes, heat exchangers, and various applications in aluminum casting equipment.



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Giant CLEVELANDS for Mesta rope transfer drives

CLEVELAND Worm Gear Speed Reducers can be king-size, too. Here are two of six units, with 36" center distance built recently for the Mesta Machine Company of Pittsburgh, Pennsylvania. These giant drives are being placed in service at a steel company as rope transfer drives in the beam mill.

Mesta continues to choose Clevelands because they know from long experience that they perform well under heavy duty steel mill service. They transmit power uniformly and smoothly. Unvarying efficiency stems from Cleveland's case-hardened steel worms which run in perfect mesh with nickel-bronze gears. And, this is a combination that actually improves with use—proven by record in hundreds of instances.

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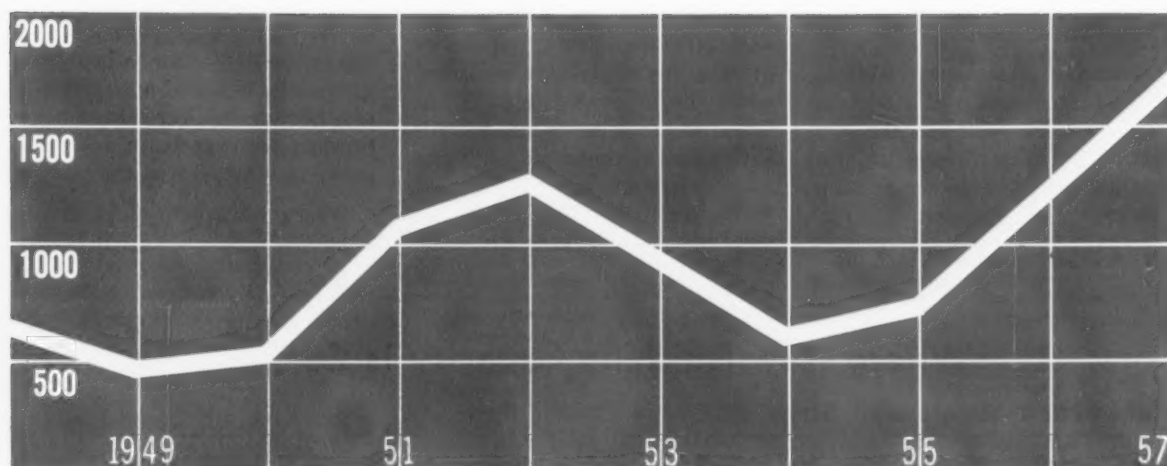
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Speed Reducers

In Millions of Dollars



1957—Estimate/Source: American Iron and Steel Institute

Steel's Spending for New Equipment

Steel Expansion Plans Stress Economy as Costs Mount

Mills aim for more output from existing units. Sinter, oxygen and oxygen converters play important roles.

New finishing capacity in structurals, plate, will help users.—By G. J. Mc Manus.

■ Climbing costs have not slowed steel expansion but they do have the industry searching for new ways to grow.

The mills are adding a minimum 4.5 million tons, possibly 6 million tons to capacity this year, a whopping 12.2 million tons by '59. Present capacity is 133.5 million tons. Among the big gainers, Jones & Laughlin is adding 1.3 million tons for an 18 pct hike. Republic Steel is adding the same tonnage as it winds up a \$200 million program.

U. S. Steel has an expansion package extending into next year

for a total gain of 2,353,000 tons. Bethlehem Steel has a similar program calling for 2.5 million tons more.

More For Less—Throughout the industry, expansion moves show strong pressure to squeeze more steel out of available dollars. The mills are getting added tonnage by:

1. Modernizing and supplementing basic facilities.
2. Installing new types of low-cost equipment.
3. Merging with other producers.

Trend Apparent—Although conventional expansion continues, these trends show up clearly in both melting and finishing projects. U. S. Steel's program is an example of the balancing-out type of growth. The corporation is adding 1.3 million ingot tons in Chicago and 670,000 tons in Pittsburgh. Only one new steelmaking unit is mentioned for

these districts—an electric furnace in Pittsburgh.

Instead of completely new equipment, the corporation is finding ways to get more metal out of existing blast furnaces and openhearth. A big element in this is the sintering plant. U. S. Steel installed a 4000-ton sintering line at Fairless Works last year. It has three 5000-ton plants coming up near Pittsburgh; three in the Chicago area; one at Youngstown.

Sintering Expands—These are not minor projects. The 15,000-ton plant near Pittsburgh is reported to cost around \$20 million. But the use of sinter increases blast furnace output 15-20 pct and decreases the coking rate. The added capacity is relatively inexpensive when compared with a new blast furnace, which costs around \$50 million.

The economics of sintering have brought an industry-wide program

that takes in some 20 major lines and is adding 30 million tons of annual capacity. The extra hot metal will go to filling in deficits and to meeting future needs.

Balancing Out — At Weirton Steel, the completion of a 600-ton openhearth last year left the mill light on hot metal. Completion of a sintering line is expected to help rebalance the openhearth charge. Weirton is looking for an 800,000-

ton increase in steelmaking capacity.

At other mills, the added hot metal will be used to maintain balance in souped-up and built-up steel furnaces. Better refractories to take higher temperatures and added use of oxygen (from 30 to 200 cu ft per ingot ton since 1930) have reduced openhearth heat times to 10 hours and even eight hours. At the same time, furnaces are getting bigger, with moderate units

approaching 400 tons and Weirton's going up to 600 tons. Bigger cranes and charging machines are needed. Adding it all up, modern openhearths are turning out something close to 40 tons an hour. For Pittsburgh Steel, modernization and enlargement of openhearths is bringing an increase in ingot capacity of 200,000 tons this year.

What's Involved — Says D. R. Loughrey, co-ordinator, steelmak-

Where New Finishing Capacity Is Coming

Cold-Rolled Sheets and Strip

Jones & Laughlin	Cleveland Canton	4 stand Sendzimir mill
Washington Steel	Washington	Auxiliary equipment — 40 pct increase
Armco	Middletown	Repowered mill — 339,000 tons added
Allegheny Ludlum	Brackenridge Wallingford	Sendzimir Sendzimir
Crucible Steel	Midland	Stainless — 70 pct increase
Republic	Warren Warren Gadsden	42-in, 4-stand 80-in cold temper C-R and galvanizing equip- ment

Hot-Rolled Sheets and Strip

Armco	Butler Middletown	New mill adds 150,000 tons Repowered mill adds 650,000 tons
Jones & Laughlin	Aliquippa Cleveland	44-in mill Reversing rougher
Detroit Steel	Detroit	Mill enlarged
Republic	Gadsden	New equipment

Structurals

Inland Steel	Indiana Harbor	Adding 25,000 per month by dropping rails
U. S. Steel	Chicago	Wide flange beam mill
Northwestern S. & W.	Sterling	16-in structural mill

Plates

U. S. Steel	Gary	Improved mill
Kaiser Steel	Fontana	110-in mill converted to 144-in
Lukens Steel	Coatesville	40 pct increase
Barium Steel	Harrisburgh	Repower 126-in plate mill
Bethlehem	Sparrows Pt.	160-in plate mill in opera- tion
Armco	Houston	Add to 130-in mill

Tinplate

U. S. Steel	Gary	Electrolytic line
	Provo	Electrolytic line
Bethlehem Steel		2 electrolytic lines
Youngstown S. & T.	Chicago	Electrolytic line
Kaiser Steel		Electrolytic line
Weirton	Weirton	Electrolytic line

Bar Mills

Pittsburgh Steel	Monessen	18-in mill
Keystone S. & W.	Peoria	Bar and rod
Republic	Chicago	11-in mill
Armco	Kansas City	Bar mill

Pipe

Jones & Laughlin	Aliquippa Aliquippa	Electricweld 2 continuous weld
Laclede Steel	St. Louis	Continuous weld
Youngstown S. & T.	Chicago Youngstown	Seamless mill Stretch reducing mill
Wheeling Steel	Benwood	\$4.5 million improvements
Lone Star	Lone Star	Stretch reducing mill

Primary Mills

Sharon	Farrell	44-in blooming, slabbing
Pittsburgh Steel	Monessen	30-in billet
U. S. Steel	Duquesne Duquesne Duquesne Chicago	46-in blooming, slabbing 36-in blooming 21-in billet Blooming mill for struc- turals
	Gary	Slabbing mill
Jones & Laughlin	Cleveland	Blooming mill
Republic	Cleveland	Blooming mill
Inland	Indiana Harbor	Slabbing and blooming
Acme	Chicago	Slabbing and billet mill

ing, Jones & Laughlin Steel Corp.: "The concern of all steel companies today, when considering expansion of openhearth capacity, centers around two factors. First, investment cost of new units and, second, operating labor cost. Investment costs per annual ingot ton for new units have risen more than 10 pct per year since World War II.

"For this reason, every effort is being made to increase the output of existing units by enlarging hearths, increasing firing rates, improving availability, use of oxygen for melting and refining, and preparation of scrap.

Large Units Wanted — "Where new units must be built, the trend is now toward very large single or multiple heat furnaces in order to save in the length and weight of buildings, pouring crane capacity, and the number of auxiliary units. As a result, the large furnaces give a reduction in operating labor costs."

A different method of low cost expansion is offered by the oxygen converter. Cost of a converter is about \$1.5 million, or about half that of an openhearth. Output of the newer converters is placed somewhere around 70 tons an hour.

Who Has Converters? — These figures have attracted the interest of all steel men and have led four companies to go ahead with converter installations. McLouth Steel has three 35-ton units now operating and two 80-ton models coming up in 1958. Kaiser Steel has three 80-ton converters due for operation next year. Acme Steel has two 50-ton units due next year.

Jones & Laughlin will put two 65-ton converters into operation this November. The company is looking for these units to bring a combined capacity increase of 750,000 tons. The start of operations at J. & L. may be the signal for others to go ahead with their own converters. Reportedly, there are several mills just waiting to look at another installation before moving themselves.

Vacuum Furnaces—In the field

How Steel's Capacity Grows

Company	Capital Spending	Added Capacity	Remarks
U. S. Steel	\$775,000,000	2,353,000 net tons	
Bethlehem Steel		2,500,000	1958 completion
Republic Steel	\$200,000,000	1,300,000	3-year program
Jones & Laughlin	\$107,000,000	1,200,000	
National Steel	\$ 90,000,000	800,000	
Youngstown S. & T.	\$ 95,000,000		
Inland Steel	\$260,000,000	800,000	1959 completion
Armco Steel		276,000	
McLouth	\$ 34,000,000	250,000	
Wheeling Steel	\$ 75,000,000	200,000	
Sharon Steel		70,000	1958 completion
Kaiser Steel	\$194,000,000	1,500,000	1958 completion
Crucible Steel	\$ 25,000,000		Double vacuum melting
Pittsburgh Steel	\$ 20,000,000	240,000	2-year program
Detroit Steel	\$ 10,000,000		250-ton openhearth
Granite City Steel	\$ 33,000,000	504,000	1958 completion
Barium Steel		75,000	
Allegheny Ludlum	\$ 16,000,000		Vacuum melting increase
Lukens Steel	\$ 33,000,000	175,000	1959 increase
Copperweld Steel			Improvements
Lone Star Steel	\$ 8,000,000		Openhearth added
Laclede Steel		50,000	
Keystone S. & W.		120,000	1958 completion
Acme Steel	\$ 50,000,000	450,000	5-year program
Total		12,213,000	
1957 Addition		4,500,000 net tons	to 6,000,000 net tons

of specialty melting, the big emphasis has been on vacuum furnaces. A new consumable electrode furnace at Watervliet, N. Y., enables Allegheny Ludlum to turn out ingots up to 12,000 lb and gives the company's vacuum shop a capacity of two million pounds a month.

Crucible Steel Corp. is doubling the capacity of its induction vacuum melting operation in a \$1.5 million program. Universal Cyclops is going ahead with both consumable electrode and induction vacuum melting. Firth Sterling is processing both types.

Finishing Mills—In the finishing end of steel production there has been more emphasis on basic equipment but supporting facilities are also getting a big play. U. S. Steel is putting in about 180 soaking pits and four primary mills. In Pittsburgh, no new finishing mills have been announced, but most of the 600,000 ingot tons being added will go into more plates and structurals. Improved supporting facilities will increase capacity.

Washington Steel is spending \$1.5 million to improve processing and handling operations. Operating with an excess of rolling capacity now, the company expects to boost shipping capacity 40 pct.

Automatic Controls — Another type of gain that is difficult to assess is that coming from improved control. Allegheny Ludlum, Jones & Laughlin, U. S. Steel and at least seven others are now installing or have installed the punch-card type of control on heavy reversing mills. This is primarily a quality move. The mills are out to get uniform rolling through programmed and automatically controlled operations.

"When you improve quality, you invariably increase output," says one mill. "If only through reducing rejected tonnage, the new controls certainly figure to boost output."

Tinplate Expands — Among the different products, market considerations have influenced expansion thinking. Tinplate producers are in the process of adding one million tons of electrolytic capacity with U. S. Steel, Bethlehem Steel, Weirton Steel (1956), Youngstown Sheet & Tube, and Kaiser all putting in new lines. A portion of the increase will be offset by retirement of hot-dipped facilities.

A significant market swing shows up in Inland Steel's recent announcement that it is going out of the rail business. Inland is leaving the well-supplied rail market in favor of heavy structurals, which are

still in good demand. By converting mills, the company will add 25,000 tons a month to wide flange beam capacity by 1959.

Structural Outlook — Other producers also are giving new attention to heavy steel. U. S. Steel's big new structural mill in Chicago will begin pounding out wide-flange beams in the first half of next year. Bethlehem has beefed up plate and structural capacity.

Lukens Steel is spending \$33 million in a program that is scheduled to up plate capacity by 40 pct by 1959. Barium Steel has repowered its 126-in. plate mill at Harrisburg, Pa.

Pipe Mills — Reflecting the strength of the oil country market, Youngstown Sheet & Tube is bringing in a new seamless mill at Indiana Harbor. Jones & Laughlin recently began operating an electric-weld mill at Aliquippa.

In addition, Jones & Laughlin has two continuous weld mills coming up. Laclede Steel also has one.

Flat-rolled production is increasing, although probably not as fast as in other years. Armco Steel is adding 800,000 tons of hot-rolling capacity; 340,000 tons of cold-rolling. Jones & Laughlin has a 44-in. hot mill coming in at Aliquippa; a 42-in. cold mill at Cleveland. Republic Steel has a 42-in. cold mill due for Warren, O.

Merger Trend — Steel mergers have come rapidly in the past 12 months. Jones & Laughlin acquired Rotary Electric Steel and Cold Metal Products. Copperweld Steel is in the process of merging with Superior Steel. Jessup Steel acquired Green River. The Bethlehem-Youngstown move is still questionable. "If it goes through, you can look for some other big ones," said one top steel man.

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Capital Spending Levels Off

Quarterly Expenditures for New Plant and Equipment.
Seasonally Adjusted in Billions of Dollars at Annual Rate.

JAN—MAR 1956	32.8
APR—JUN	34.4
JUL—SEP	35.8
OCT—DEC	36.4
JAN—MAR 1957	36.8
APR—JUN	37.0
JUL—SEP	37.2
OCT—DEC	37.1

Industry Expansion Levels Off

Survey shows fourth quarter spending for new plants and equipment will be down from third quarter.

It's an important indicator for businessmen to watch.

■ Spending for new plants and equipment is leveling off, with a slight decline expected in the fourth quarter.

In spite of the leveling tendency, a record total of \$37 billion will be established this year for capital spending. This is indicated in the quarterly survey of new plant and equipment outlays by the Dept. of Commerce and Securities and Exchange Commission.

Less Than Estimated—The survey indicates that fourth quarter spending will be at the annual rate (seasonally adjusted) of \$37.17 billion, compared with the rate of \$37.23 in the third quarter.

Fourth quarter spending will be under original estimates, which at

mid-year were placed at \$37.9 billion. Third quarter spending was also somewhat under original estimates.

Economic Barometer—Businessmen are eyeing capital outlays carefully. It's recognized that these outlays have been the bulwark of the current boom for metalworking. Spending for consumers' goods has not kept pace and much of the economic strength of 1956 and 1957 is directly attributed to the capital goods boom.

The survey points out that manufacturing firms will maintain their peak outlays of fixed investment throughout the year. Iron and steel and nonautomotive groups will spend one-third more this year than last. Largest change is the 100 pct increase in outlay in the nonferrous industry.

The only substantial decline is around 30 pct in motor vehicles, down from the tremendous 1956 expansion.

Where to Start Cutting Costs

Take the Overall Product Approach

Cost cutting isn't a hit or miss proposition, to be confined to individual departments.

It starts with raw materials and design, carries through the finished product. One vital necessity: A well-trained cost reduction team.

■ **How's your cost reduction team?** A farm equipment producer recently totaled the score. For every \$1 spent in hiring cost reduction men, \$18 had been returned to the company in savings on manufacturing costs.

A cost reduction program is nothing more than examining every phase of manufacturing a product, designing that product, and buying materials for the products. It can be done by large plants or small. The "team" may consist of one man or 20. But the result is the same. A sudden, measurable drop in the cost of putting your product on the market.

First Step—The latest thinking: One man should be given cost reduction in the plant as his full time job. He'll begin with foremen education. In a recent survey, a major automotive company learned that about 75 pct of workable suggestions for reducing manufacturing costs originated with foremen. Another finds four or five good ideas originating at the shop supervisor level.

The cost control chief must school these men in cost-consciousness. At the same time, the cost control engineer, in a small plant, will be checking plant operations on his own. For foremen, he'll probably conduct regular training sessions. Tell them what's happened in other departments.

On the Team—The cost account-

ing department also becomes a team member. Manufacturing costs are drawn up on a monthly basis, for each product or department. These are charted and compared with original estimated costs, as well as established cost standards.

At Allis-Chalmers and at Heil Company, foremen learn at a monthly session just how well their cost control performance compares with other departments and the standards originally set for their own department.

Specialists Needed—Vapor Heating Co. retains a cost analysis man who has some background in accounting, time and motion study, and in engineering. It isn't easy to hire a man with this wide a background. But firms with effective cost control programs now regard the cost control position as one of

key importance. A number of future executives are placed in the job as a training ground that will give them an excellent overall picture of how their plant works.

With one man running quarterback, any cost control program becomes, nonetheless, a team project. Some plants hold monthly sessions. Some have a "team" meeting weekly. Others have no formal meeting times, but insist that all phases of manufacture be coordinated to reduce costs.

Start With Design—The process begins in the design department. The chief of cost control sits down with representatives of purchasing, design, and manufacturing. Each suggests what specifications can be made in the proposed product to reduce cost without impairing quality. The plant superintendent sits in, as top plant official.

Make Everybody a Cost Control Man

■ **Cost reduction may come under the overall jurisdiction of one man. But it can be everybody's job.**

As stated here, cost reduction begins with the design department, with representatives of purchasing, design and manufacturing all contributing suggestions on the product.

As a part moves off the drawing board and into manufacture, suggestions will begin to come in from superintendents, foremen and production workers who have an interest in their jobs.

These ideas may go to the plant superintendent, to the cost control engineer.

The main idea: Ideas are wel-

come from anywhere and anybody. When an idea comes up from the shop, it should find open doors all the way to the top.

If an idea is good, there should be a reward. One company awards a plaque, another cash. Others make it clear that cost reduction is one strong step toward promotion. One company even bypasses the idea originator, gives him a night out with his wife at company expense. (They've had a suggestion boom.)

Cost reduction starts at the raw materials department and doesn't end at least until the finished product leaves the shipping department. And it may not stop there.

What's the real story on cutbacks in military spending? As far as this year's outlays are concerned, the net effect will be zero. Looking beyond this fiscal year (which ends June 30, 1958), the effect of cuts will be chiefly to stretch out procurements over longer periods of time. No further abrupt cancellations of contracts are planned.

Trend from here on is to concentrate on standardized weapons and weapons system. Costly bickering between the Army, Navy, and Air Force is to subside.

Of the \$38 billion in new money at its disposal this year, about one-third is earmarked for purchase of "military hardware"—missiles, planes, tanks, guns, and the like.

To prepare the following story, Editor R. M. Stroupe talked with top officials of the Defense Department to gain first-hand facts and figures on the effect of the cutbacks. Generally speaking, the recent cutbacks put into effect by the Defense Dept. are not related to the reductions written into the new military budget for this fiscal year.

Defense Cuts Won't Hurt Much

■ Metalworking companies will see some changes made because of the decision to hold military spending to \$38 billion for the year.

For most firms the prospect need not be frightening. They can market their products in about the same areas and to the same buyers as they do now. Some metalworkers, though, will find the going a little rougher. They'll have to scout around for new customers.

This latter group will contain some suppliers to prime contractors in the aircraft industry. The field is particularly affected by the armed forces' economy drive, for by far the greatest portion of defense spending is for costly items—aircraft, missiles, and ships.

Missile Impact—Suppliers to the shipbuilding industry, though, should be almost untouched by the holddown on spending. The procurement pattern in this business will be basically unchanged.

Elsewhere, too, there is little to alarm metalworking firms. Buying of tanks and other combat vehicles has reached a level-off stage. Ammunition manufacture doesn't involve much subcontracting.

There is to be no major shift in the buying of production equipment in the near future.

But it's a different story in the aircraft industry. Greater emphasis on missiles, as compared with manned aircraft, is bringing about an altered prime contractor-subcontractor relationship.

Changing Air Package—Dominant among the prime contractors in the aviation field are the large airframe producers. They are comparatively few, but their responsibilities regarding national air strength are many and detailed. Now the producers, for a compelling reason, are reviewing their policies on the farming-out of production of components.

That forceful reason is the changed status of the airframe itself. From a cost standpoint, the airframe is still the most important element in manned aircraft. But in missiles, the airframe is of lesser consequence than the propulsion and guidance equipment and the nose cone.

Diversification Stimulated—Airframe producers are anxious to retain the principal sources of aviation dollars; thus they must diversify. To a considerable degree, the builders discover they can handle a greater portion of the total end-item, using about the present man-

power, facilities, and floor space.

Those primes who decide they haven't the personnel or the plant to take on more of the job may buy firms to do the work. Hence the electronic equipment producer of small to medium size may get an offer to sell the business to one of his current big customers.

The Defense Dept. isn't anxious for the diversification of the industry giants to go too far. It takes no position that a stated number of small components suppliers will be retained. But through such means as subcontracting clauses in procurement contracts, the Pentagon hopes to prevent a wholesale loss of subcontractors.

How Much Cramping?—In the military, the question is raised whether many suppliers, large or small, will be cramped by the \$38 billion budget. Spending was rocking along at an annual rate of around \$40 billion in the last few months of the year ended last June 30. For that full year, though, spending came to \$38.4 billion.

While that figure was higher than budgetmakers had predicted, it wasn't so lofty as to make a \$38 billion ceiling unthinkable for this year. The proposed drop in spending is to work out at less than 1½

pct of the recent \$38.4 billion.

This reduction, it is estimated, can be achieved in part by stretch-outs in the buying of high-cost items. An example is the intercontinental B-52, an \$8-million item. Lead time for the plane has been ordered cut from 30 to 15 months before the economy plans were made. Now the lead time is extended to 18 months.

Stretchouts alone cannot do the money-saving job, of course. Prices for materials and finished goods are rising and must be met. Cuts in overtime on military contracts offer one method of doing this. A more drastic approach is a reduction in personnel and, to some extent, in procurement.

Fewer Employees—This action doesn't point to many contract cancellations such as the dropping of the Navaho project. It denotes a greater effort to get equal or better production from fewer employees in certain industry lines, notably aircraft. This single field unquestionably is going to offer fewer jobs under the present defense program.

At the peak Korean War period, the aircraft industry employed about 800,000 persons. That number rose to 910,000 during the past year. Recently the figure was only slightly below 900,000. And while the average work week dropped by two hours from last January until midsummer, productivity remained about level.

Manpower Cuts—Reduced manpower both in and out of the military will have the task of creating thoroughly modern armed forces. Plans to drop 100,000 servicemen by next Dec. 31 are already on record. Possibly by late fall the Pentagon will be prepared to call for further cuts.

Compared to national labor force of well over 60 million, the military and civilian reductions will have a minor effect. In the long run, the Pentagon believes, skilled performance by somewhat fewer persons will be sufficient to keep national defense strong.

Swiss Mount Drive To Lower Tariffs

Big ad campaign stresses that Swiss buy more from U. S. than we do from them.

Objective is more sympathetic hearing of arguments against high watch tariffs, possible quotas.

Swiss watchmakers are making an all-out play for support from American industry in their running fight with the U. S. watch industry.

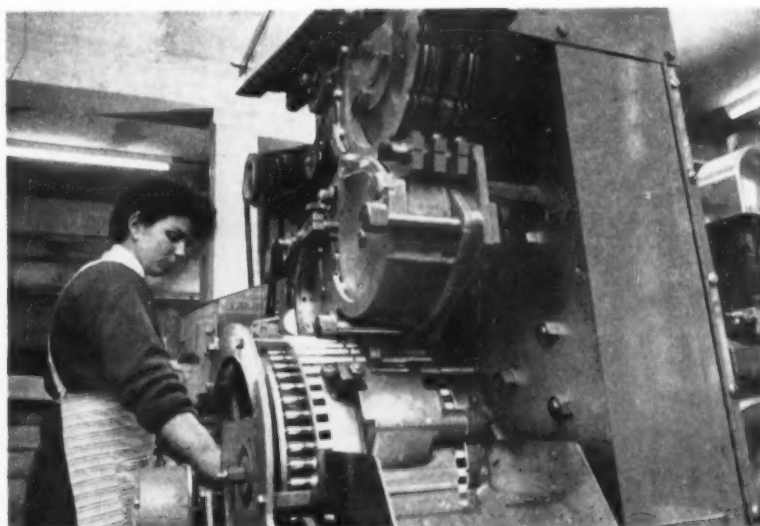
Kick-off of the new play will be advertisements in leading business magazines, stressing what Switzerland buys from the U. S. The ads will point out that in the period 1946-1956 the Swiss have bought over \$2 billion worth of goods from this country. American imports from Switzerland for the same period was \$1.5 billion, leaving American business a fat trade balance of about \$500 million.

Big Machinery Buyers—The ads will be tailored to various industries, show that out of total U. S.

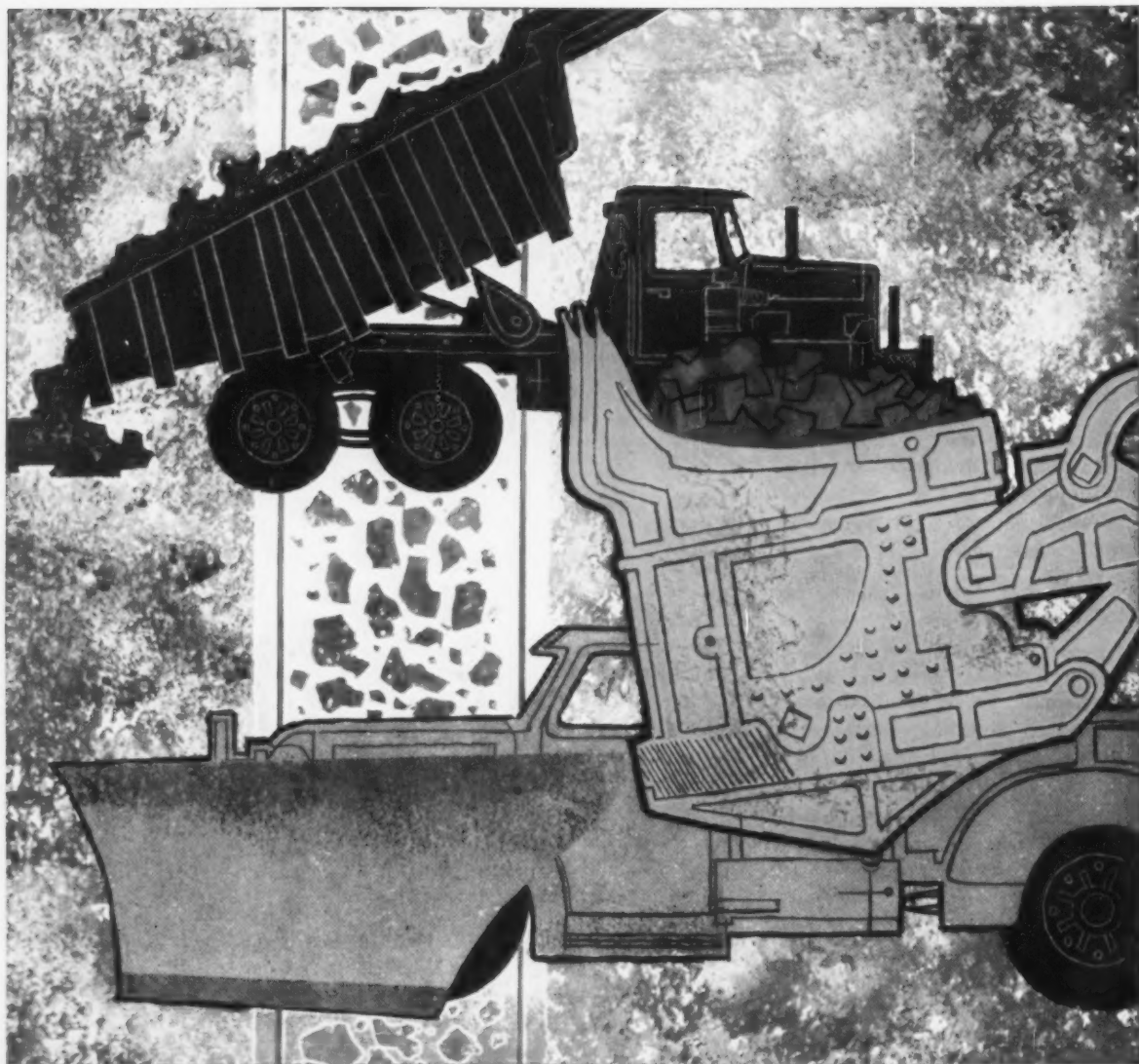
exports to Switzerland of \$233,232,000 in 1956, over \$26.5 million was for made-in-America machinery, almost \$36.5 million for aircraft and aircraft products, over \$32.5 million for metals, just under \$23 million for automotive products, and more than \$9.6 million for electrical and electronic equipment.

And the Swiss are quick to point out that much of this was paid for by the more than \$177.5 million worth of American imports from Switzerland. Almost half of these U. S. imports were watches and watch movements.

The Goal—Main objective of the new Swiss campaign is recognition of Switzerland's importance as a customer of U. S. industry. They also hope for a more attentive hearing of their arguments against high watch tariffs and possible quotas. Among other points, they claim they can invalidate the "defense essential" argument of American watchmakers.



MADE IN U. S.: Swiss say this AMF filter tip cigarette machine is typical of substantial imports from the U. S. Cost: About \$37,000.



JALLOY special alloy steel

resists impact and
abrasion in toughest
applications

Heat treated Jalloy steels wear as much as 20 times longer than mild steels under rigorous impact and abrasive conditions. By using Jalloy you can cut maintenance costs drastically. Increased product life reduces downtime and lowers your labor costs.

Jalloy steels are available in the forms you require (plates, hot rolled sheets, hot rolled bars, small shapes and structurals). Jalloy can be purchased in three grades to meet specific use requirements: Grade 1, where formability is important; Grade 3, capable of being heat treated to excellent physical properties for good resistance to abrasion or wear; Grade 7, where high hardness with good ductility or wear resistance is desirable.

Your local distributor can supply you with latest information on these Jalloy grades, or you can write to Jones & Laughlin Steel Corporation, Dept. 403, 3 Gateway Center, Pittsburgh 30, Pa.



Jones & Laughlin
... a great name in steel

Bearing Plant Design Pays Off

Sales and Production Barriers Licked

Timken's new installation at Bucyrus, O., highlights some good ideas in production, marketing and labor relations.

Net result: Customers buy plant's product at a 15 pct saving.—By T. M. Rohan.

■ Tradition went out the window when they designed the new \$15 million plant of Timken Roller Bearing Co. at Bucyrus, O.

Examples:

Many of the plant's production machines are simply bolted to the floor. When a breakdown occurs, maintenance crews hurry to the scene with a lift truck. The ailing machine is unbolted and hauled away to the shop. A spare machine is moved in and bolted down quickly. Specially-designed couplings for compressed air, water, electric power, and oil get the spare unit into production in short order.

Preventive Maintenance — Timken engineers and machine tool builders designed and developed new tools incorporating original thinking aimed at more efficient production. Timken paid for this additional development cost. Some of these new machines are now standard with equipment makers.

Another innovation: To minimize machine breakdowns, they are pulled off the production line after a given number of hours of operation. The system — adapted from airline engine maintenance practice — was inaugurated by H. H. Timken, Jr., board chairman, a long-time aviation enthusiast.

Bonus System Helps — Timken has speeded up production and maintenance in other ways: (1) All shop workers from skilled men to sweepers and oilers work under an incentive plan, (2) maintenance

men carry tools and spare parts to the scene of a breakdown in small carts; so there's no need to go back to the shop for special wrenches and fittings.

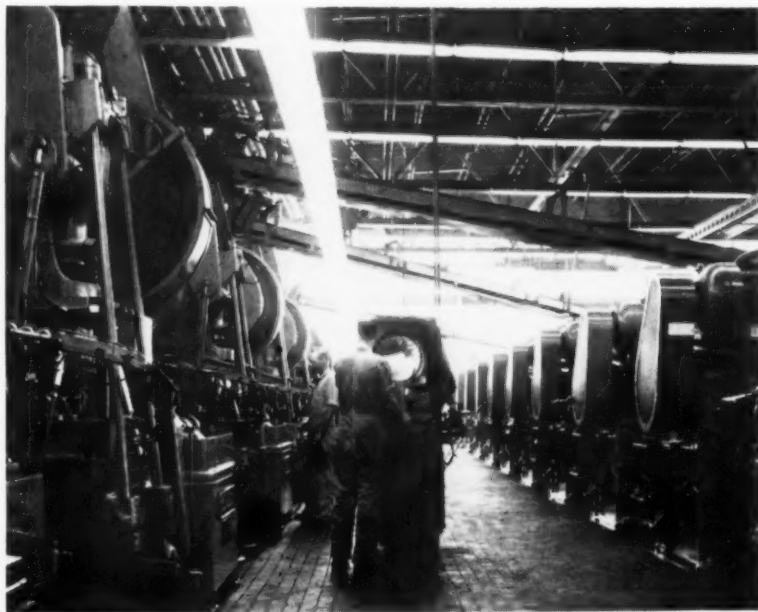
But even before the plant was built, Timken's top executives and salesmen did plenty of spadework with customers. For one thing, there were too many types and styles of bearings used in automotive and allied industries. Standardization was needed to make a high-production, low-cost plant possible.

Standardize and Save — This was Timken's proposition to the major auto makers: Standardize requirements into a minimum number of lines, and roller bearing prices could be shaved by 15 pct. The result: Timken was able to consolidate output into 14 major production lines.

Timken has benefited, too. It's increasing its share of the bearing market. It can sell product of its Bucyrus plant 15 pct cheaper than from its older plants at Canton, Columbus, and Zanesville. Newer technical improvements are expected to widen the gap to 25 pct. Timken says it now accounts for 25 to 30 pct of the anti-friction bearing market.

It also has its eye on broadening sales to the railroad market. Of the 2 million freight cars now in use, some 50,000 have roller bearings, half of them Timken bearings. "This," says W. E. Umstattd, company president, "is the single biggest field ahead for us for the next several decades."

It's estimated that roller bearings would save railroads 22 pct per year on their investment. Saving would be due to using less power and including more cars per train.



YEARLY OUTPUT—27 MILLION: These five cone lines at the new Bucyrus, O., plant of Timken Roller Bearing Co. are an important factor in the firm's productive capacity of 27 million cones during a year.

Instruments Show Their Ability

Cleveland Exhibit Displays Latest Developments

Metalworkers were among the curious at the 12th Instrument-Automation Conference and Exhibit.

Five hundred exhibitors showed latest instruments that are moving into industrial applications.

■ A table-top TV size transistor convertor capable of measuring one millionth of a volt caught the eye of many metalworkers in Cleveland last week.

The unit, introduced by Daystrom, Inc., has no moving parts and will scan 350 points and instantly flash a warning and locate a trouble spot. This "DADIT" unit is a vital part of a fully automatic control system going into

a new Louisiana Power and Light Co. generating system.

One of Many—Displayed at the 12th annual Instrument-Automation Conference and Exhibit of the Instrument Society of America, it was one of the hundreds of instruments that attracted some 20,000 persons, looking for the newest development to help improve their manufacturing operations.

The Daystrom unit, while destined for a power and light system, could be adapted to such diverse fields as steel mills, chemical or food processing plants.

A large portion of the visitors were not even connected with the instrument producing industry. Rather, they were interested in what

is possible in their own fields from the new equipment coming up.

Sample Developments — There were many other eye-openers. Here are a few:

Texas Instruments, Dallas, showed off a telephonized remote fluid level indicator. From a central point, a checker can directly dial storage tanks of various chemicals across the country and have the liquid level shown immediately within 1/16 in.

A Cycledyne Co., Detroit, electric clutch will stop a drive shaft in a fraction of a revolution from 1800 rpm. With a gear reduced, the shaft can be stopped and positioned within a few thousandths of an inch. These are used principally for conveyors, machine tools and transfer mechanisms from 3/4 to 60 hp and eliminate large control apparatus and other equipment.

Magnetic Tape Application—Magnetic tape operation of milling machines is now to the point where an entire airplane wing section is automatically milled on 5 axes from a solid billet. Ampex Co., Redwood City, Calif., has installed the tape control on machine tools for Lockheed and Douglas and the system is on order for Boeing.

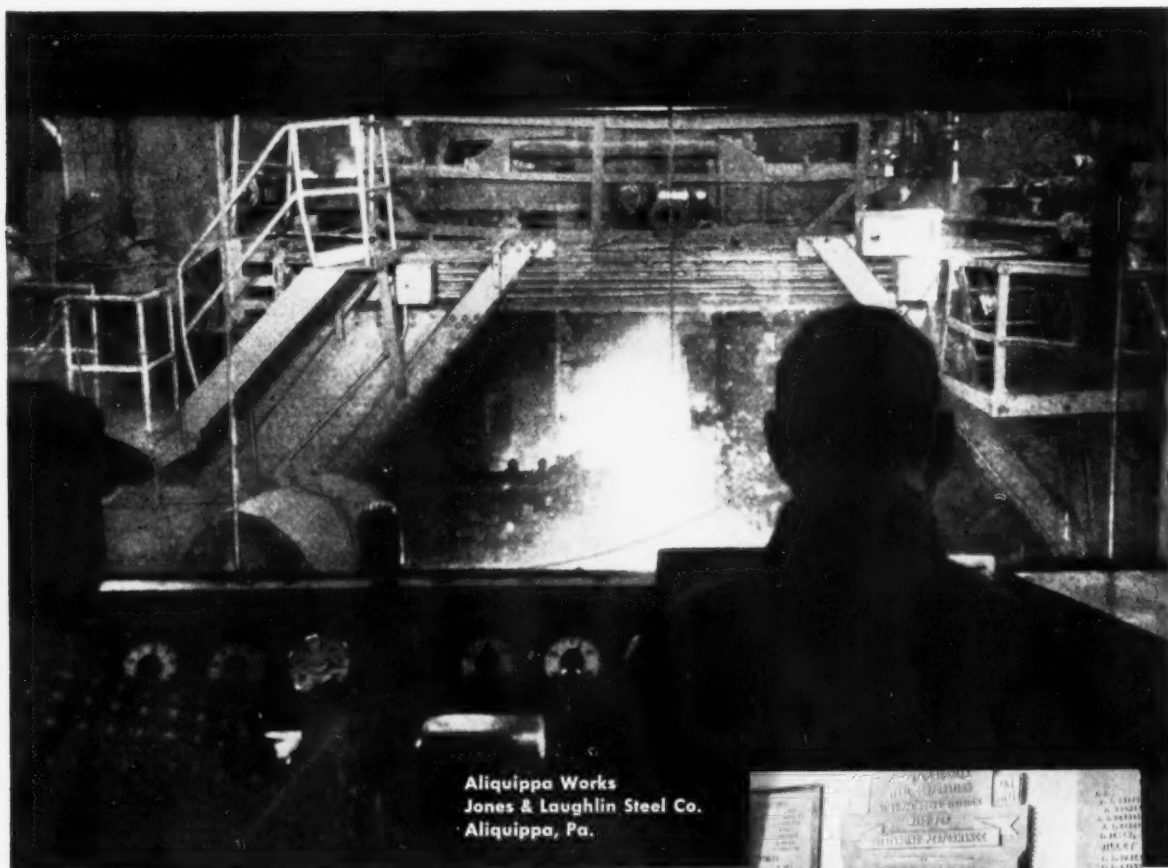
A single operator can control several of the huge machines and the tape will run for 90 minutes. By eliminating making of templates, the installation is a big cost cutter.

The picture-in-a-minute Polaroid Land camera is also at work in industry. Finished lantern slides ready for projection at meetings can be turned out in two minutes, as well as photomicrographs and other conventional subjects.

Robert J. Jeffries, of Daystrom, Inc., was elected president of the Instrument Society of America at the Society's meeting.



TESTING: One of the many instruments that caught the eyes of metalworkers at the 12th Annual Instrument-Automation Conference. These are modular cabinets made by Elgin Metalformers Corp. They house load banks to simulate loads in testing generators at Jack & Heintz Co., Cleveland.



Aliquippa Works
Jones & Laughlin Steel Co.
Aliquippa, Pa.

An ingot a minute!

and never a lubrication failure with
Cities Service EP-21 Lubricant!

At Jones & Laughlin's Aliquippa Blooming Mill, they believe in production with a capital "P"!

Not only does J&L's Aliquippa Mill hold the world's record for ingots rolled in an eight hour turn (576), but they've set a year-in, year-out average of an ingot per minute!

How do they sustain this production for such long periods?

One answer lies in their modern, 44-inch, two-high reversing unit, powered by four 3000 h. p. motors arranged in tandem twin drive.

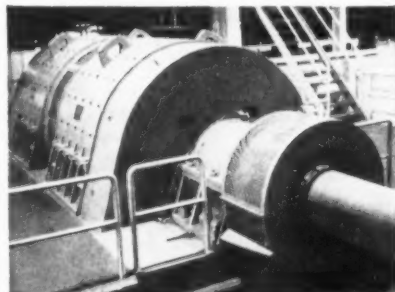
Another can be found in their lubricant . . . Cities Service EP-21. Used on main bearings, manipulator slides and window liners, Cities Service EP-21 and its superior additives provide an unusually tough film . . . tough enough to stand the highest pressures, the greatest shock loads with no loss of lubrication, no danger of rust or corrosion.

Yes, Jones & Laughlin is pleased with Cities Service lubricants! You'll feel the same when Cities Service goes to work in your operation. Talk with your Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

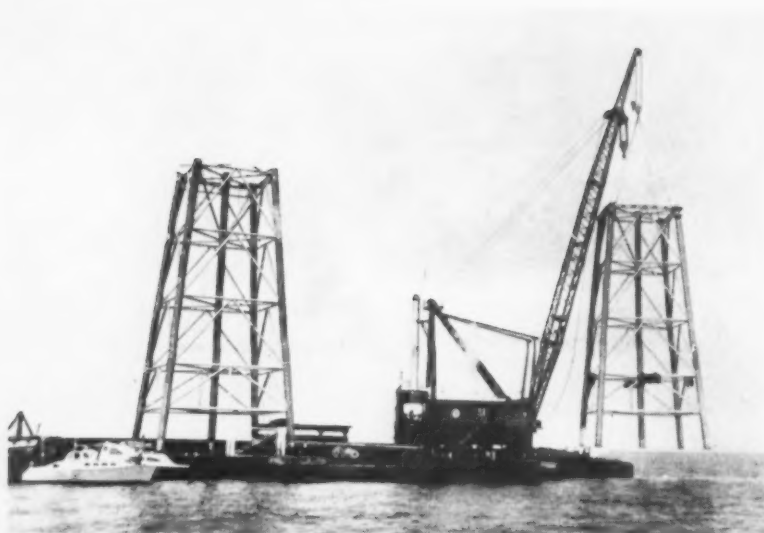
CITIES SERVICE
QUALITY PETROLEUM PRODUCTS



Award for 8-Hour Turn Record is displayed proudly outside mill. J&L smashed previous record by 38 ingots—rolled up new total of 576! Year-in and year-out, the plant averages an ingot a minute, with flawless lubrication provided by Cities Service.



Four 3000 h.p. Motors power the blooming mill at J&L's Aliquippa Works. These are 70 to 140 rpm, double-armature units arranged in tandem twin drive. At 70 rpm, they can reverse in under a second. Equally flexible is the mill's lubricant—Cities Service EP-21.



ALUMINUM PLATFORM: Offshore oil well drilling platforms in Lake Maracaibo, Venezuela, are the first to be made of aluminum, says Reynolds Metals Co. Developed by Reynolds and J. Ray McDermott & Co., Louisiana, they can be installed in three days, and easily moved to new locations.

Fruehauf Extrudes Own Aluminum

Fruehauf Trailer will operate a new \$3 million aluminum extrusion plant in Decatur, Ala. The new plant will be built and equipped by sale of revenue bonds by the City of Decatur and will be operated by Fruehauf under a long term lease.

Construction of the 95,000-sq ft plant will begin within 60 days. Production of aluminum extrusions (cross members, floors, tank extrusions, rail and door components) for Fruehauf trailers will begin in July, 1958.

The plant will be another step in the company's production integration program and will reduce substantially the company's inventory of aluminum extrusions.

Canco Researches Aluminum Cans

A division to find a practical, low-cost method to manufacture aluminum alloy into commercial containers has been established by the American Can Co.

William C. Stolk, company presi-

dent, says the company has perfected the techniques to produce both aluminum alloy and aluminum steelplate cans on a pilot line basis.

But at present, there are no low-cost commercial methods to make aluminum cans at high speed. Tin cans now roll off production lines at rates as high as 30,000 per hour.

"The present restricted use of aluminum containers in this country also is directly related to the metal's higher cost, compared with steel," Mr. Stolk explains. "However, Canco's costs for tinplate have increased more than 91 pct in the last ten years. The gap between the cost of the two metals has been narrowing constantly," he said.

Ferroalloys Coming

Manufacturing operations are scheduled to begin during October in the new ferroalloy plant of the Vanadium Corporation of America near Steubenville, O.

The plant, officially named the Vancoram Plant, reflecting the trade name of the product line, is one of VCA's largest manufacturing operations and one of the world's most modern units for making ferroalloys.

The plant will manufacture low carbon ferrochromium alloys, including Vancoram EXLO. Other products will comprise various types of high carbon ferrochromium and a complete series of ferrochrome-silicon alloys.

Bethlehem Files Reply

Bethlehem Steel Co. has filed an affidavit in reply to the Justice Dept.'s motion for summary judgment against the proposed Bethlehem-Youngstown merger in Federal District Court in New York before Judge Edward Weinfeld.

Next step will be Judge Weinfeld's decision on the motion. If he approves the government's proposal, Bethlehem must and undoubtedly will appeal to the United States Supreme Court. If he disallows the Justice Dept. motion, regular hearings on the case in Federal District Court will resume.

Some time is expected to elapse before Judge Weinfeld will ready his opinion. Many observers believe it probably will not come until after the new year because of the complexity and volume of arguments.

Fall Military Orders Headed Up

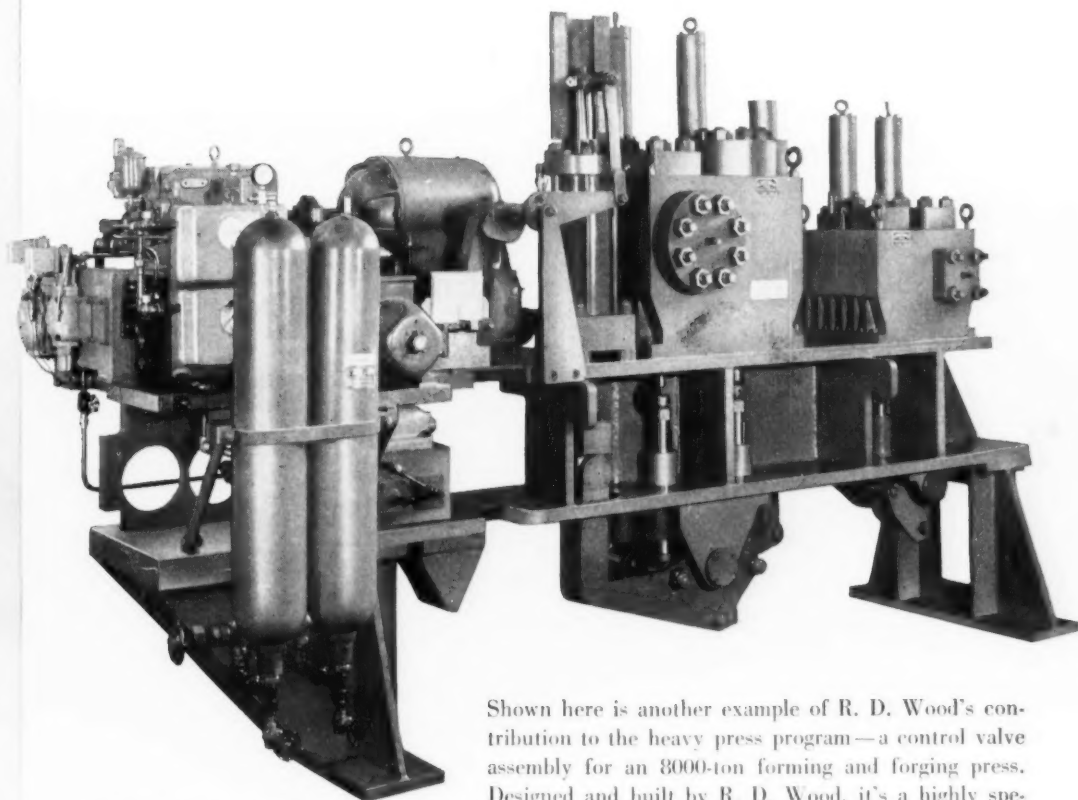
Orders for military materials are slated to go up appreciably, though not sharply, by late fall, under present Pentagon plans.

Procurement agreements that have been hanging fire for months probably will be signed in the next couple of months. However, the Defense Dept. is likely to space out some billions of dollars in new awards over an extended period, rather than to place a great many contracts at once.

Delayed by Study—The delay in buying under the present \$38 billion defense budget ceiling results from a painstaking Pentagon study of military procurement.

To stay within the current budget limits, the armed forces have already reduced or lengthened some of their commitments under present contracts.

Big help in heavy press program



Remote electro-hydraulic servo control valve assembly. Length is 14 feet; height 9 feet.

Shown here is another example of R. D. Wood's contribution to the heavy press program—a control valve assembly for an 3000-ton forming and forging press. Designed and built by R. D. Wood, it's a highly specialized type. It indicates R. D. Wood's ability to handle the most difficult valve engineering and manufacture.

Other standard R. D. Wood high-pressure hydraulic valves include stop, operating, check, relief, and safety types. Since 1803, the name R. D. Wood has stood for superior products. Write for details on R. D. Wood high pressure hydraulic valves for every purpose.



R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

Representatives in Principal Cities



MAKERS OF HYDRAULIC PRESSER AND VALVES



FIRE HYDRANTS



CAST-IRON PIPE



GATE VALVES



GAS PRODUCERS



ACCUMULATORS



2 new **ELPAR** Fork Truck Series



DOUBLE-DUTY **"Safe-Hite" Fork Trucks**

These ELPAR electric trucks operate in street trucks, tunnels, basements—wherever limited headroom is a factor. Upright design also permits high stacking in storage. The model pictured, for example, is only 68" high, yet has a lift of 100".

Operator safety is assured, despite the extremely low truck height. He sits 18" lower than on conventional models . . . his head is below the top of the uprights. Completely new engineering of frame and other units accomplishes this without sacrificing operator visibility, comfort or efficiency. Capacities: 2000, 3000, 4000 pounds.



GET FULL DETAILS on these and other trucks in the complete ELPAR fork truck line. Write for General Catalog and Individual Truck Bulletins.

HEAVY-DUTY **Fork and Ram Trucks**

These rugged giants take overloading and rough treatment in stride. They are the culmination of Elwell-Parker's 50 years' experience in the steel industry—the toughest lift truck proving ground of all.

ELPAR heavy-duty electric trucks are packed with features like *dual drive motors* for maximum power and flexibility . . . *narrower overall width* . . . *picture-window vision* . . . *hydraulic power steer* . . . *power brakes* . . . and many other design features that assure dependable performance year after year. Available with forks or rams in capacities from 20,000 to 80,000 pounds.

THE ELWELL-PARKER ELECTRIC COMPANY

4298 ST. CLAIR AVENUE • CLEVELAND 3, OHIO

Horace D. Gilbert

He Helps Small Parts Do Big Jobs

The trend to miniaturization wouldn't have gone far without smaller ball bearings.

Aware of this many years ago, Mr. Gilbert set out to specialize in this field.

Along the way, he discovered a way to run a company more smoothly.

■ Problems that seem small in size loom large in scope to Horace D. Gilbert, president of Miniature Precision Bearings, Inc. That goes for administration as well as production problems.

In a new plant on the outskirts of quiet Keene, N. H., Mr. Gilbert oversees operations of a company whose product is essential to the electronics, aircraft, and medical instrument industries. Yet the firm's total output for the year could be spread on the top of a standard size desk.

Hastens the Trend—Mr. Gilbert started in business in 1940 with an order to supply a dozen bearings for the now famous Norden bomb-sight. By contrast, last year MPB made more than two million bearings on order. Some are so small they can be seen clearly only with aid of a jeweler's loupe.

In the years between, Mr. Gilbert has been an influential voice in one of the most active trends in modern industry — the move to miniaturization. Development of high speed, complex instrumentation and control equipment has put a premium on small size-big performance units.

Claims Industry "First"—"Without smaller and smaller precision bearings, there wouldn't be any point to designing lighter and smaller rotating and oscillating



H. D. GILBERT: (center) Let good men take part in policymaking.

machines," he says. "We've got to supply the answer for industry."

His answers apparently have been quite satisfactory. MPB's new plant at Keene, costing \$750,000, is reputed to be the first built expressly for the manufacture of miniature ball bearings. For Horace Gilbert, the plant is the realization of a 15-year dream.

The Group Approach—But the building of a company brings with it many new problems. One that faced Mr. Gilbert is common to executives in other growing companies: The rise of a capable group of men from lower echelons whose voice in company policy cannot readily be denied. In typical head-on manner, Mr. Gilbert worked out

a solution. "The group approach, that's our answer," he says.

The group approach differs from the more formal committee type meeting mainly in who attends. It has a vertical representation. When a policy is being reviewed or a plan of operations needs discussing, a group is called together. Each man is invited to give his opinion. "There are good men in this company and it would be silly to waste them on non-decision-making levels," Mr. Gilbert points out.

It's Good Business—The system is helping smooth the way for MPB's \$300,000 expansion. "It will go a long way, too, toward helping us develop even smaller bearings," Mr. Gilbert adds.

how to rustproof cold rolled steel in shipment and storage



Proved by actual test! Unwrapped steel rusted within a few hours. Identical steel wrapped in Ferro-Pak showed no signs of rust . . . even after several months. Non-toxic chemical vapors from Ferro-Pak coat the steel with an invisible film that makes it impossible for rust to get the slightest foothold.

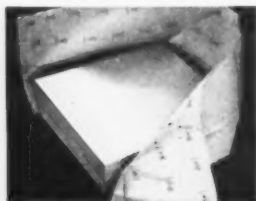
Even under adverse conditions, such as outside storing or shipping, Ferro-Pak provides complete protection. It is waterproof, strong,

yet highly flexible and easy to handle. The chemical rust inhibitor is compatible with oil and stays effective for long periods even when the humidity soars.

Whether you're a shipper or a buyer of steel, it will pay you to specify Ferro-Pak wrapping wherever rust is a problem. For an interesting idea brochure on many uses for Ferro-Pak, write Cromwell Paper Company, 4803 South Whipple Street, Chicago 32, Illinois.



How to rustproof a freight car—Ferro-Pak is used to line sides of car and to interleave coils, transforming ordinary freight car into huge rustproof package.



How to rustproof black plate—On this light gauge, dry, uncoated steel, rust can start from a fingerprint. Ferro-Pak keeps black plate rust-free even when the humidity soars!

FERRO-PAK[®]

by Cromwell

For over 38 years—
"Paper Engineers" for Steel

Why Labor Likes Its Overtime

Future demands for a short work week are linked to the acceptance of overtime pay as a normal part of weekly pay.

If workers are conditioned to 10 pct of their income coming in time-and-a-half, they will fight to hold it.

■ Sooner or later you will have to come face to face with a demand for a shorter work week.

At the moment, the noise and shouting is confined to the United Auto Workers. And there is a lot of evidence that it will be traded for dollars when the showdown comes next year, but not forever.

Know the Issues — It will pay you to do a lot of thinking and studying of the work week in your plant. You will want to know how it stands in relation to the national trends. You will want to know the facts about your labor supply.

You will also want to know your workers' attitude toward the aspects of the short week; whether emphasis will be on economic or sociological factors. (In shop talk, do they really want fewer hours, or just more overtime?)

Overtime Adds Up—In recent years, workers have become so adjusted to overtime work, and pay, that it is considered a normal, not exceptional, factor in their lives. There are exceptions, of course, among industries and individual plants.

A new Bureau of Labor Statistics study reveals that overtime pay made up an estimated 10 pct of the factory workers' weekly earnings in 1956. This amounted to roughly \$8.02 a week in time-and-a-half.

That pace is not being equaled in 1957, but the average for the month of June was still \$7.24 a week, or 8.7 pct. In durable goods industries the average for last year and this year is slightly higher than overall manufacturing.

Attitude May Change—In the primary metals industries the average for 1956 was \$9.62 a week in overtime. It went as high as \$10.88 in September 1956, but has dropped off to \$8.31 in June this year, with lower months intervening.

Your employees' collective attitude will be conditioned by

economic developments. Logically, if he is so conditioned to his overtime pay that he budgets it in his own expenditures, he will be determined to recover it one way or another if it is taken away.

Not Today — Don't look for a really irresistible drive for the short week while the worker is able to draw substantial overtime on his present work week.

Furthermore, the fact that overtime is still needed in most of industry, with employment at a record high, points out the unrealistic nature of a shorter week at this time.

Index "Masks" Price Movements

No Agreement—The debate over inflation, or danger of inflation, continues unabated. Few authorities will agree on any aspect of its nature, extent, cause or control.

In the midst of all the confusion, your business has to go ahead with its planning, with little or no consensus of thinking on how to proceed in terms of prices you will have to pay for materials.

Check the Elements—One pitfall to avoid: Don't follow the indexes too faithfully without investigating their elements. As one authority pointed out in referring to one price index, "This relative stability masked some notably divergent movements."

In this respect, it's noted in the Wholesale Price Index of the Bureau of Labor Statistics that the volatile commodities at the moment tend to be depressed. In the first half of this year, for example, the

sliding prices of zinc, lead and copper kept the metals index from climbing. In fact, it dropped 1.2 pct in spite of higher steel price.

Consumer Price Lags—For the year ending June, 1957, the BLS points out, iron and steel rose 10.6 pct while nonferrous metals fell 12.6 pct.

Another point to consider is that the rise in the Consumer Price Index, current cause for most alarm, may be "lagged response" to the sharp rise in the Wholesale Price Index which occurred in 1956.

The Wholesale Price Index is still rising, but at a much slower rate than the Consumer Price Index. In the first six months of 1957, the CPI climbed 1.9 pct while the average of wholesale prices went up only 0.9 pct. In 1956, wholesale prices rose 3.9 pct compared to 2.9 pct rise in CPI.

Are Auto Tail Fins Functional?

Chrysler Offers Proof That They Are

Sales reports show fins are useful enough, from a money-making standpoint.

But from an engineering approach, their function is debatable—By H. R. Neal.

■ For automakers and buyers alike, 1957 will be remembered as a year of controversy. And the big commotion is centered on Chrysler's sweeping tail fin styling.

At this stage of the 1957 auto year it is well nigh impossible to refute the fact that fins sell cars. But why fins in the first place? Are they a styling tool, or functional by nature? Pro and con, the arguments have gone on for nearly a year. Engineers debate engineers. Stylists argue with rival stylists. Customers listen to them all, and get in their \$3000 worth.

Exner Talks—Coming forth to clear the exhaust for once and for



UNUSUAL LINES: Analysis of the effect of 200 mph winds spreading ink blots on surface of plastic model determined Dart's streamlined shape.



THE DART: Chrysler's newest idea car was created in Italy especially for testing aerodynamics. It may have strong influence on future car styling.

all is Virgil Exner, Chrysler Corp.'s vice president and director of styling—the man who has probably done more with automobile styling of late than anyone in Detroit. Tail fins are his trademark.

At a meeting of the Society of Automotive Engineers in White Sulphur Springs, W. Va., he confessed: "aerodynamic considerations had influenced the shape of Chrysler Corp.'s current production cars."

Test Results — For clarification, Mr. Exner cited tests conducted in the University of Detroit's wind tunnel and the information they furnished.

These tests "demonstrated that the design of our 1957 model cars exerts a stabilizing effect much as do tail fins on airplanes and 'unlimited class' power boats. With the high upswept fins of our 1957 models, tests showed that road-holding stability improved, reducing steering correction by as much as 20 pct in strong crosswinds at normal highway driving speeds," he said.

Balancing the Wind—In describing how this vehicle stability is achieved, he explained most of the

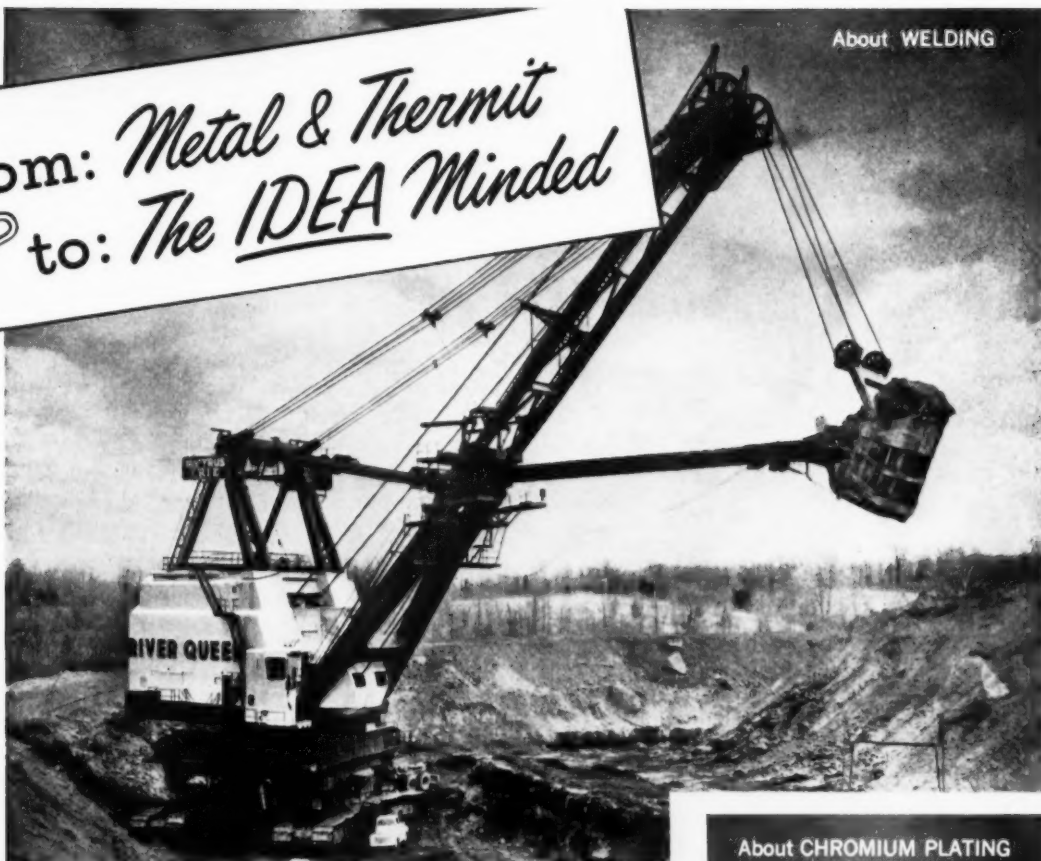
force of a sidewind acts on the front portion of a finless car. This tends to make it veer from its course. By adding fins a larger surface is presented at the rear of the car. Sidewind is thus directed so its force is better balanced about the center of gravity, which acts as a pivot point.

"By aerodynamic design, then, the sidewind itself is made to compensate for its own ill effects. This relieves the driver of some of the steering effort required to keep the car within its highway lane when gusty conditions prevail," Mr. Exner explained.

Italian Firm Helps — Chrysler's wind tunnel testing is not something dreamed up this year just to help sell fins either. Carrozzeria Ghia, custom auto builder of Turin, Italy, has worked with Chrysler along these lines for some time.

Ghia was selected to build a car around aerodynamic facts revealed in wind tunnel tests conducted in Turin. Chrysler supplied advanced engineering innovations and specified the basic dimensions of the car, Mr. Exner said. "Otherwise the shape was determined solely by the

from: *Metal & Thermit*
to: *The IDEA Minded*



About WELDING

Taking a big bite out of costs

Built by Bucyrus-Erie, this mammoth all welded shovel makes shorter work out of coal stripping operations. In one bite, it scoops an 80 ton load into its 14 x 12 x 9 foot bucket . . . bigger than an average room. The shovel stands 13 stories high, weighs more than 4,000,000 pounds . . . and is built for long, trouble-free service with strong welded connections.

Metal & Thermit's "Murex" electrodes were selected for many applications on this big welding job. These versatile, easily handled electrodes are used throughout industry wherever strong and reliable welds with good impact qualities are needed.

About PLASTISOL COATINGS



Jobs for plastisols become bigger . . . and still BIGGER

Interior of this large fume scrubber was sprayed with Unichrome Plastisol by Kaybar, Inc., Birmingham, Mich. The thick vinyl coating withstands abrasion, acids, alkalis, and many other corrosives. Being pore-free and seamless, the Unichrome Plastisol lining is now preferred for many jobs where rubber or plastic sheet linings were used formerly.

Note that sheer size is no longer a hindrance in applying plastisols. Firms like Kaybar with ever-expanding facilities are located at key points and can handle your big jobs, too.

About CHROMIUM PLATING



Key performance in typing

Every buyer of an IBM Electric Typewriter knows how easily and economically it operates. Little do they know, however, of the many quality details that go into its construction for extra dependability.

Trip levers, for instance—vital links between key and letter—are chromium plated for increased resistance to wear and corrosion. Unichrome SRHS® Chromium is plated from a Unichrome Continuous Chromium Plating Barrel which assures complete coverage of parts, large output and economical operation.

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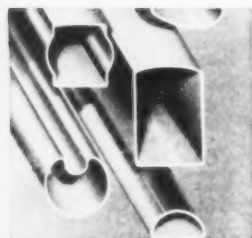
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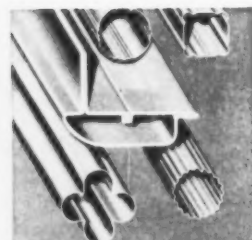
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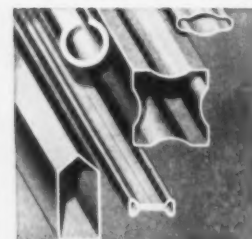
SPECIAL SHAPES



WELDED TUBING



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ANGLES & CHANNELS



van huffer roller die, cold formed metal shapes and tubing

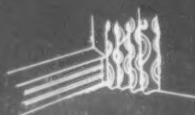
*simplify design,
increase production,
reduce cost!*

*Typical ideas that have
taken shape in metal
for a variety of
industrial applications*

Look at the variety and versatility of these shapes, then take a closer look at your product. Maybe it could be made faster, better and at a lower cost with Van Huffer shapes . . . roller die, cold formed to any lengths from a wide variety of metals: hot or cold rolled steel, stainless steel, high strength steels, coated steels, copper, brass, aluminum, etc., from coiled strip 1/2" to 33" wide; in gauges from .003 to .312; from forming dies designed and built in our own plant. Consider, too, the advantages of using Van Huffer's complete fabricating services which include notching, bending, punching, tapering, flanging, beading, etc.

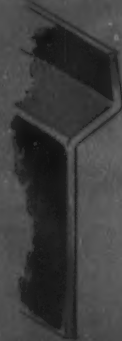


**SECTIONS FOR
BASEBOARD
HEATING**



BUILDING CONSTRUCTION

Door and Window Sash
Lighting Fixtures
Garage Door Track
Wireway Channel
Garage Door Panels
Air Conditioning
Partitions
Railings
Door Frames



**SECTION FOR
SICKLE BAR**

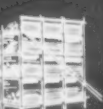


FARM EQUIPMENT

Poultry Feeders
Power Take-off Shields
Mower, Tractor
Combine Parts
Auger Type Conveyors
Tank Rails
Hitch Tubing
Exhaust Pipes
Animal Stalls



**SECTION FOR
STORAGE RACKS**



MATERIALS HANDLING

Storage Pails
Conveyor Systems
Truck Rub Rails
Trailer Frames
Elevators
Lift Truck Parts
Railroad Equipment
Automatic Pin Spotters
Road Machinery



**DRAWER SLIDE
SECTIONS**



METAL FURNITURE

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Beds
Card Tables
Lamps
Lawn Furniture
Kitchen Equipment
Costumers
Hospital Equipment
Office Equipment
Washer, Dryer
Stove Parts

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Automotive Production

WEEK ENDING	CARS	TRUCKS
Sept. 14, 1957*	88,844	16,947
Sept. 7, 1957	90,704	17,416
Sept. 15, 1956	63,798	20,076
Sept. 8, 1956	47,827	14,655
TO DATE 1957	4,570,870	791,230
TO DATE 1956	4,155,694	807,147

*Preliminary. Source: Ward's Reports

form which showed the least possible air disturbance in aerodynamic research."

Result: The Dart—Ghia turned out the "Dart" for Chrysler, which Mr. Exner calls "one of the most efficient aerodynamic passenger car designs in the world today."

He pointed out the Dart is a study vehicle "which will assist Chrysler Corp. in designing future production automobiles whose appearance will be admired by the public and whose performance will be aided by their style."

Aiming Higher—"We are continuing wind tunnel and performance tests to learn ways of further improving appearance; to obtain more fuel economy and better performance from a given size engine by reducing the force necessary to penetrate the air; and to reduce driver fatigue, thereby increasing safety; by controlling wind wander and improving the stability through more functional design."

"The work already done confirms the value of using as many aerodynamic facts as possible as guides to contemporary styling concepts."

Looking Ahead—Between the Dart and the dictum could lie a clue to Chrysler's plans for 1960—the year of the next big change. Unless a radical turn in public taste is detected soon, fins will be around for a time yet.

As for the function vs. flair controversy, it still is pretty hard to overlook the fact Mr. Exner is rated by many as the auto industry's top stylist.

Restyling of the 1957 Chrysler line is given most credit for the company's improved sales record.

Smog Solution?

Two General Motors researchers have found you can boost engine performance and cut down the oxides of nitrogen in auto exhaust—a leading ingredient of Los Angeles-type smog.

George J. Nebel and M. W. Jackson report that carburetor modification to provide maximum performance at all speeds and throttle settings would cut the smoke-making gases to a few hundred parts per million parts of air.

But there's a rub. Fuel economy would be reduced and carbon monoxide emission increased. "This approach is like taking several steps backward because years ago carburetors having these characteristics were in common use," they said.

Air Mixture Vital—The GM researchers tested five engine variables that affect engine performance: air-fuel ratio, spark timing, manifold air pressure, engine speed and compression ratio.

Air-fuel ratio, Mr. Nebel and

Mr. Jackson reported, is the most significant factor affecting output of nitrogen oxides. A lean mixture, giving good fuel economy, boosts the nitrogen oxide concentration.

Big Three Will Sell Ramblers

American Motors Corp. is boosting sales of its Rambler and Metropolitan lines—and it's getting Big Three dealers to do the boosting.

AMC is franchising GM, Ford and Chrysler dealers to handle its products along with their regular lines of cars. "And they have to sign up to handle the whole line, not just the Rambler," an AMC source chortled.

Dealers handling medium price lines in small to medium size markets make up the majority of those dualing with AMC. Estimates run as high as 125 dealers having made the move. Oldsmobile dealers seem particularly receptive to the idea—probably because Buick and Pontiac each will have a small car to sell for 1958.

THE BULL OF THE WOODS

By J. R. Williams





Bucket crane of the Level-Luffing type operates speedily under EC&M Contra-Torque Hoist Control



Bucket cranes in this fertilizer plant operate at high output with EC&M Contra-Torque Hoist Control

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HERE'S HOW **EC&M** **FREQUENCY RELAY** **CONTROL**

improves A-C Bucket Crane
performance

FAST GETAWAY! Quickly responsive to the frequency of the induced-rotor voltage, EC&M FREQUENCY RELAYS match torque requirements to the load. They get the motor up to speed quickly for lowering the bucket and moving the trolley in or out. A lot of time saved between trips!

WIDE SPEED SELECTION! These relays permit pick-up of Contra-Torque lowering connections on any master switch speed point. No waiting until last down point is reached. Wider choice of speed gives greater flexibility in clean-up operations and speeds output!

SMOOTH STOPPING ELECTRICALLY! *Off-point braking** brings the descending load to rest and the magnetic brake sets to hold the load. Electrical braking has practically eliminated holding brake wear on many cranes now equipped with this feature.

SPEED-LIMITING! Safety on all speeds. These relays (one set for hoisting and lowering) automatically shift motor connections to safeguard lowering operation with far greater skill than human hands.

**Off-point braking to eliminate brake wear*
—a new EC&M development for AC bucket cranes



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Labor Unions: Clean Up or Else

Aroused Congress May Take Drastic Action

McClellan committee's disclosures changed the attitudes of a lot of congressmen who could see no evil.

Now, the possibility of labor legislation has changed from scant to likely, unless labor does some vigorous policing—By G. H. Baker.

■ Cleaner unions will emerge in 1958. Because evidence of corruption among labor leaders is still growing, the Congress is going to insist next year that steps be taken to end dishonesty in the union hierarchy.

It's no longer a question of whether or not some union officials are dishonest. The only question now is: Will the unions successfully clean their own houses, or will the federal government forceably do it for them?

Mood Changes—Only a few months ago, there was little chance that any bill to force clean unions would succeed. The McClellan rackets-investigating committee had only scratched the surface. Congressmen of both political parties who hail from labor areas were indignantly denying that anything was wrong in the house of labor. Legislation to stop stealing didn't have a chance.

But when the new session of Congress is seated in January, the picture will be radically different. Few congressmen now claim that all labor leaders are honest. More and more, it looks like some drastic clean-ups are going to take place.

Mitchell May Act—Will the

unions successfully purge themselves of wrongdoers? Or, will the Congress feel compelled to write some tough new laws to force clean-ups upon an unwilling hierarchy?

Ike's Secretary of Labor, James P. Mitchell, discloses that he is writing a plan to end corruption and other questionable practices in unions. But he won't take his plan to Congress if the unions show signs of carrying out a vigorous clean-up themselves.

Right-to-Work? — "It depends upon how well labor cleanses its own house," he declares.

Mitchell is under pressure to include in his clean-up plan a federal right-to-work plan, but it is doubtful that he will accept this proposal. Mitchell and the White House consider right-to-work laws to be much too hot to handle. They prefer to leave the issue of compulsory unionism up to the states.

"Sell" Foreign Aid

U. S. aid to foreign nations will move ahead on schedule, despite the complaints of aid bosses that Congress failed to appropriate as much money as was asked by the White House. Foreign aid administrators earlier this year protested that the budget cuts were "a stab in the back" to the relief program. But now they admit that neither military aid nor economic gifts will be drastically shaken up. They are finding numerous ways to "make do" on their smaller budget.

Actually, the only item that's new around foreign aid headquarters these days is an aggressive advertising campaign, now in the making, designed to "sell" foreign aid to the Congress and to the public. (Theory here is that Congress will vote more money for other nations if "the foreign aid story" is told in greater detail.)

Kefauver's Price Probe Fades

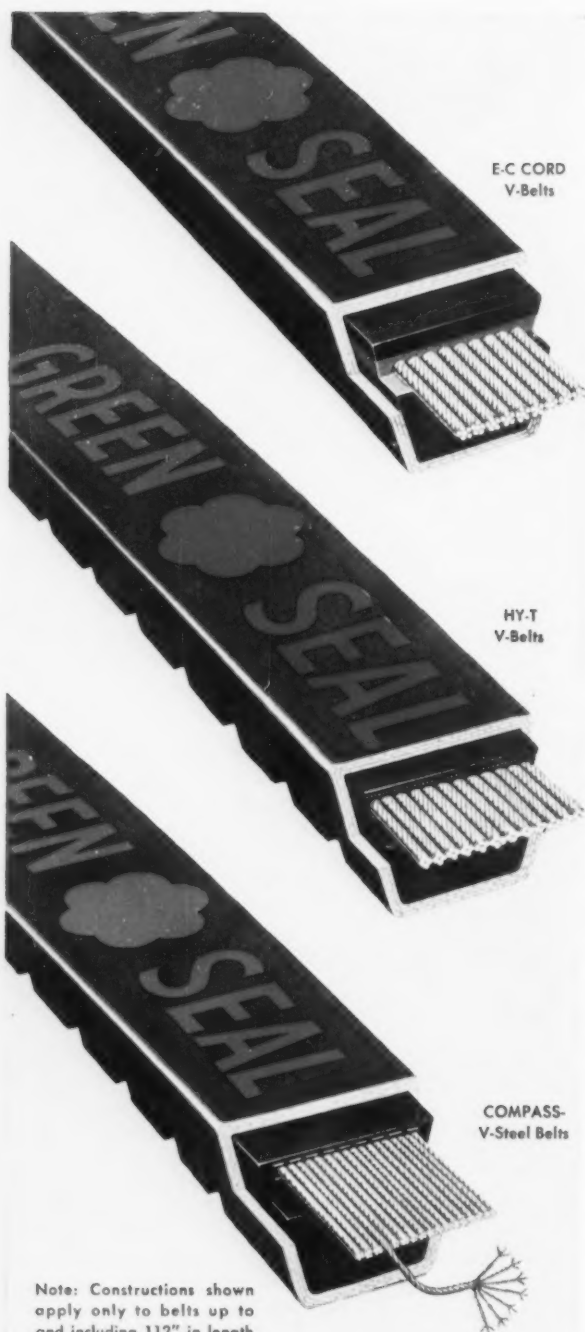
Nothing Definite — When—and if—the Senate will reopen its study of steel prices still hasn't been decided. Way matters stand now, Chairman Kefauver, D., Tenn., of the Senate subcommittee looking into steel prices, is out of the country until early October. Until he returns, there'll be no definite plans.

Kefauver in August called officials of U. S. Steel and the United Steelworkers (AFL-CIO) to explain steel prices. After listening to the two sides of the story, he suspended further hearings with the disclosure that he may call representatives of Bethlehem Steel Corp. and other steel companies in October. But,

beyond this remark, nothing is definite.

Disgruntled—It is an open secret in Washington that Senator Kefauver is irritated at the failure of his steel price investigation to thus far "fire up" public indignation. As a result, it is possible that the price investigation is already a matter of history, and that no further hearings will be held.

It's also possible that the Senator was unprepared for the aggressive defense of the steel industry, which came out fighting instead of assuming a defensive attitude as it has in the past.



Why V-Belts with the Green Seal ?

The Green Seal is put on each Goodyear multiple V-Belt for *your* protection. For it's your sign of a belt with dimensional stability—something long sought but only recently achieved in a complete line of V-belts.

What does dimensional stability mean to you? It means belt length remains the same from factory to drive. The length you order is the length you get. Matched sets stay matched. And mismatching — the biggest problem in belting multiple drives — is now a thing of the past.

How was this dimensional stability achieved? Until recently, stable belt length was possible only with steel cable load carriers as developed by Goodyear. But now it is also accomplished with synthetic cord through the exclusive Triple-Tempered 3-T process that stabilizes length by careful tempering with Tension, Temperature and Time.

Triple-Tempering also gives you a stronger, more shock- and stretch-resistant belt. Add "balanced construction" — with each component of the belt designed to its job—and you have a smoother, longer-running belt which means maximum, trouble-free horsepower hours at minimum cost.

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Missile Push Aids Electronics

More Instrumentation Is Now Required

With the switch from manned aircraft to missiles, electronics firms scent a coming boom.

Also benefiting will be the metalworking suppliers serving them—By R. R. Kay.

■ Look for the electronics industry on the West Coast to skyrocket. It's now doing 25 pct of the nation's electronics business. Sales in 1956 were \$1.6 billion. This year's will be even higher.

Guided missiles have top priority with Pentagon planners. Military spending for electronics will soar to new heights over the next few years and into the 1960's.

Tied to Missiles—So, if you are selling machine tools, materials, or services to the West Coast electronics industry plan on boosting sales quotas.

The business is there, and is still growing at a rapid pace. Last year the Farwest had 15 pct of the nation's electronics firms, 17 pct of the employment, and 25 pct of the sales.

Since the swing from manned aircraft to missiles, military electronics manufacturers see their business booming. One major instrument maker on the Coast says that missiles need three times as many instruments as manned aircraft do. The electronics system of a guided missile has about 12,000 different electrical components, and each component has at least two connections.

Electronics Show Host—The rising importance of the electronics industry to the over-all economic growth of the West Coast is appar-

ent everywhere you look. About 120,000 persons work in it. And recently, 25,000 customers and prospects jam-packed the Western Electronics Show in San Francisco's Cow Palace. More than 629 companies from all over the country showed off their newest products.

Where They Are—This up-to-the-minute rundown should help you with your marketing plans. The Western market is concentrated in:

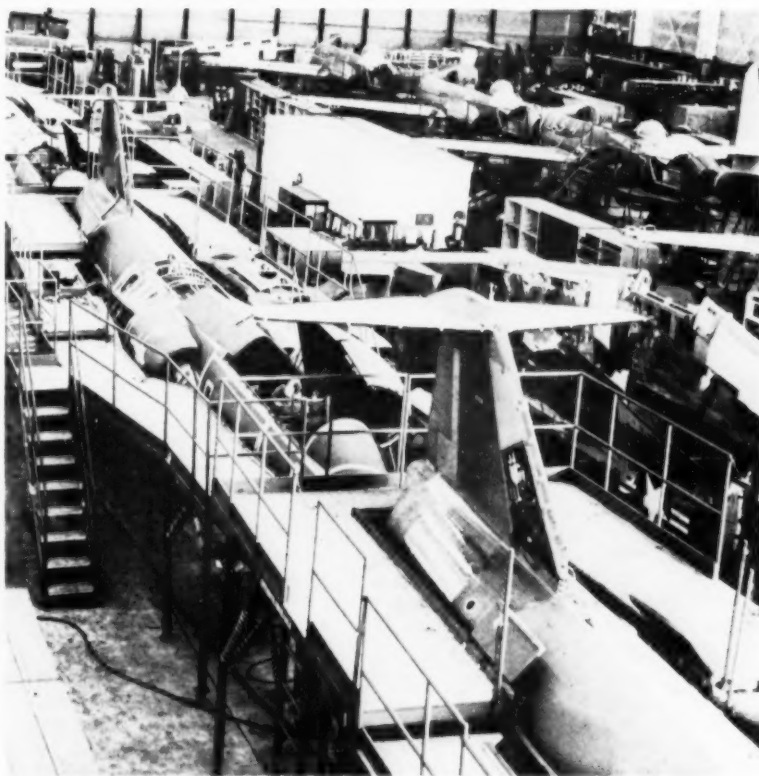
(2) San Francisco-Oakland Peninsula.

(3) San Diego: The main works for the Atlas Intercontinental Ballistic Missile.

Correction

In last week's column we indicated that Harvey Aluminum's new reduction plant at The Dalles, Ore., will have an annual capacity of one million pounds. It should have been 108 million pounds.

Next Comes the Wild Blue Yonder



END OF THE LINE: Following this final assembly of the U. S. Air Force's new F-104A Starfighter in the production hangar of Lockheed's Palmdale, Calif. plant the high, T-tailed plane will enter flight testing.

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for itself?



MARVEL SAWS'
Automatic "Brain"
Adjusts Blade
Feed Pressure
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Every Stroke to

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The exclusive automatic Dual Power Feed built into every MARVEL Series 6 and 9 Hack Saw is the "brain" that adjusts and compensates both pressure and depth of feed correctly in proportion to the number of blade teeth in contact with the work. Once the MARVEL Dual Feed is set, no operator attention is required to insure that the blade is cutting as deeply as possible and practical on every stroke . . . regardless of the changing area of the work being cut. Whether the Saw is being used for continuous automatic cut-off of identical pieces or a single cut, the MARVEL Dual Feed that practically "thinks for itself" guarantees that the work is cut-off in the fewest possible number of strokes.

Heavy duty MARVEL Series 6 and 9 Hack Saws embody every practical design and operating feature to give you speed, accuracy and operating economy you can find in no other metal cutting saws.

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New Twist for Tough Drill Jobs

Machine Speeds Multiple Hole Operations

A Detroit machine builder comes up with a drilling tool that bypasses hand layout.

Fast positioning, opposed spindles, help reduce job time from days to hours — By E. J. Egan, Jr.

■ They're called "sheets," but the metal sections that support thousands of individual tubes in modern condensers and heat exchangers for chemical and atomic plants may actually be 10 in. thick. And a lot of them are needed these days.

Drilling a pattern of precision-spaced holes in these big (up to 6-ft diam) metal slabs is never child's play. The stakes run pretty high when the job may call for 2400 $\frac{3}{4}$ -in. diam holes, and the on-center spacing must be held to within 0.010 in.

New Method—But there is a way of doing the work faster than the old technique, which called for hand layout, center punching, and drilling and reaming one hole at a time.

The new method, demonstrated recently by special machinery builder Walter P. Hill, Inc., Detroit, uses a fully automatic, opposed spindle drilling machine.

Separate Positioning—The machine has two hydraulically-powered drilling heads mounted opposite each other. Each head travels vertically on a pair of heavy steel columns. A table on which the workpiece is fixture-mounted travels horizontally in the space between the opposed heads.

Both drills work simultaneously, but not on the same row of holes. Automatic vertical indexing moves

one drill head up as the other one moves down. A separate positioning system automatically moves the table and its workpiece the correct horizontal distance for each new hole.

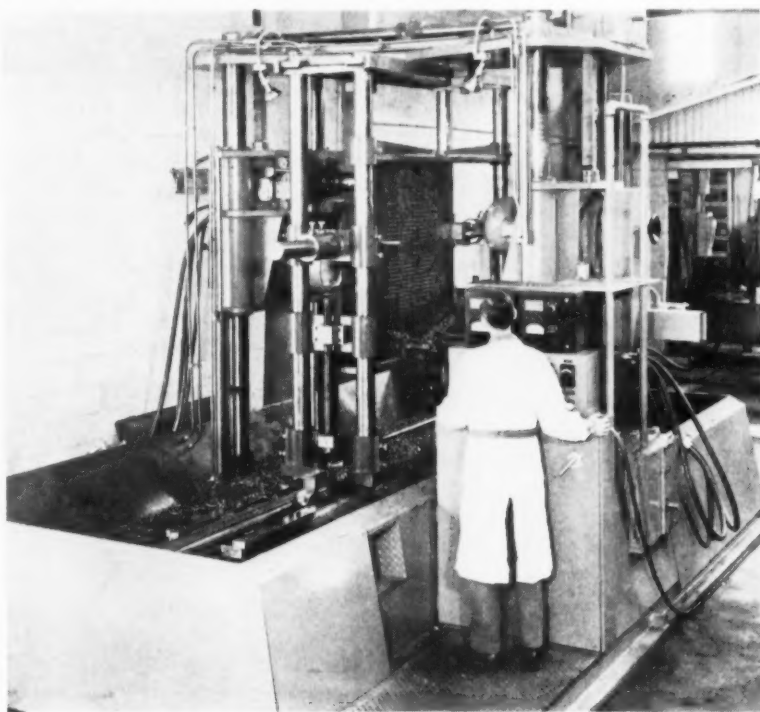
Needs No Reaming—Using conventional oil-flute drills, the machine produces holes from $\frac{3}{4}$ to $1\frac{1}{4}$ in. in diam, at feed rates up to 18 in. per minute. A single feed-and-retract cycle of the drill bit is all that's needed to produce round, straight holes that do not need a final reaming.

Automatic indexing motions are controlled by individual escapement wheels actuated by gears. Gears, in

turn, are driven by racks and pinions through shafts leading to the table and the two drilling heads.

Big Time Saver—A simple manual adjustment will switch the automatic cycle from single to double indexing, or back again. This facilitates drilling of square or diamond-shaped hole patterns. To omit drilling any hole in the pattern, the machine attendant simply punches a button on the control panel.

The new drill will produce 2400 $\frac{3}{4}$ -in. diam holes in a 5-in. thick plate in about 8 hours. This is about $\frac{1}{20}$ of the time required with the old hand layout, drilling and reaming method.



FAST WORK: Opposed-spindle drilling machine cuts holes in 10-in. thick plates with no strain. Two hydraulically-powered drilling heads travel vertically on heavy steel columns. Machine was built by Walter P. Hill, Inc.

INDUSTRIAL BRIEFS

Michigan Merger—Two Michigan firms, Marshall & Wells Co. and Air Engineering Co. have consolidated their operations with Air Engineering Co. emerging as the principal firm. Main office for the new organization will be in Kalamazoo, Mich. Branch offices will be in Grand Rapids, Mich., and South Bend, Ind. Personnel of both firms will remain intact.

In Mothballs—Kaiser Aluminum & Chemical Corp. has closed its fluorspar mill near Fallon, Nev. It has placed the facilities on a standby status for an indefinite period. The mine was closed earlier this year by depletion of deposits at the location and the mill had been operating on stockpiled ore.

Miscellaneous Data—I. L. Auerbach has organized a new electronic data processing company. The newly formed company, Auerbach Electronics Corp., will have headquarters in Narberth, Pa., near Philadelphia. The company will specialize in the application of data processing techniques in the fields of automation, industrial process control, telemetering, automatic test equipment, digital communications and numerical machine tool control.

Practice Session—The 1957 Shop Practice Forum, sponsored by the Porcelain Enamel Institute, is scheduled for Nov. 6-8. The annual event, "Improved Processing & Control Methods," will be held at Ohio State University. The forum is aimed at the interchange of ideas, techniques and plant experience among production supervisors and enameling shop personnel.

Keep It Dry—Parker Rust Proof Co. of Detroit, has opened a new plant at St. Louis, Mo. It is Parker's sixth in the U. S. and Canada. The firm manufactures an extensive line of products for the surface treatment of metals.

Look Next Door—The Tube Turns Div. of National Cylinder Gas Co., Louisville, Ky., will expand its plant area about 40 pct by converting building on property adjacent to its main plant. The company signed a \$400,000 construction contract with Sullivan & Cozart of Louisville to connect three existing buildings. This will create a new manufacturing area under one roof.

Long Enough—After 30 years at one location, the Sales and Administrative offices of Corhart Refractories Co., Inc., have moved to a new address. New location is 940 Commonwealth Bldg., Louisville 2, Ky.

Foil Study—Aluminum Co. of America, has established a fundamental research facility to serve the foil and packaging industries. The operation will be known as the Foil & Packaging Div. of Alcoa Research Laboratories. It will be located at New Kensington, Pa.

Up and Out—Gibson Electric Co., producers of electrical contacts, has moved its manufacturing facilities and offices. Gibson's manufacturing, research, purchasing, marketing, sales, and office facilities, formerly located in Pittsburgh are now housed in a new plant in Delmont, Pa.

Tally Ho!—The Sheffield Corp. has acquired a major interest in M.P.J. Gauge & Tool Co., Ltd., Birmingham, England. Eventually, the British company will manufacture and sell all Sheffield products in the English market. Initially, production will include products of Sheffield's standard production instruments division.

Hot Contract—Alco Product, Inc., has an order for three intermediate sodium heat exchangers. They will be built for the \$54 million Enrico Fermi nuclear electric generating station near Detroit. The heat exchangers to be fabricated at Alco's Dunkirk, N. Y., plant are valued in excess of \$1.7 million.

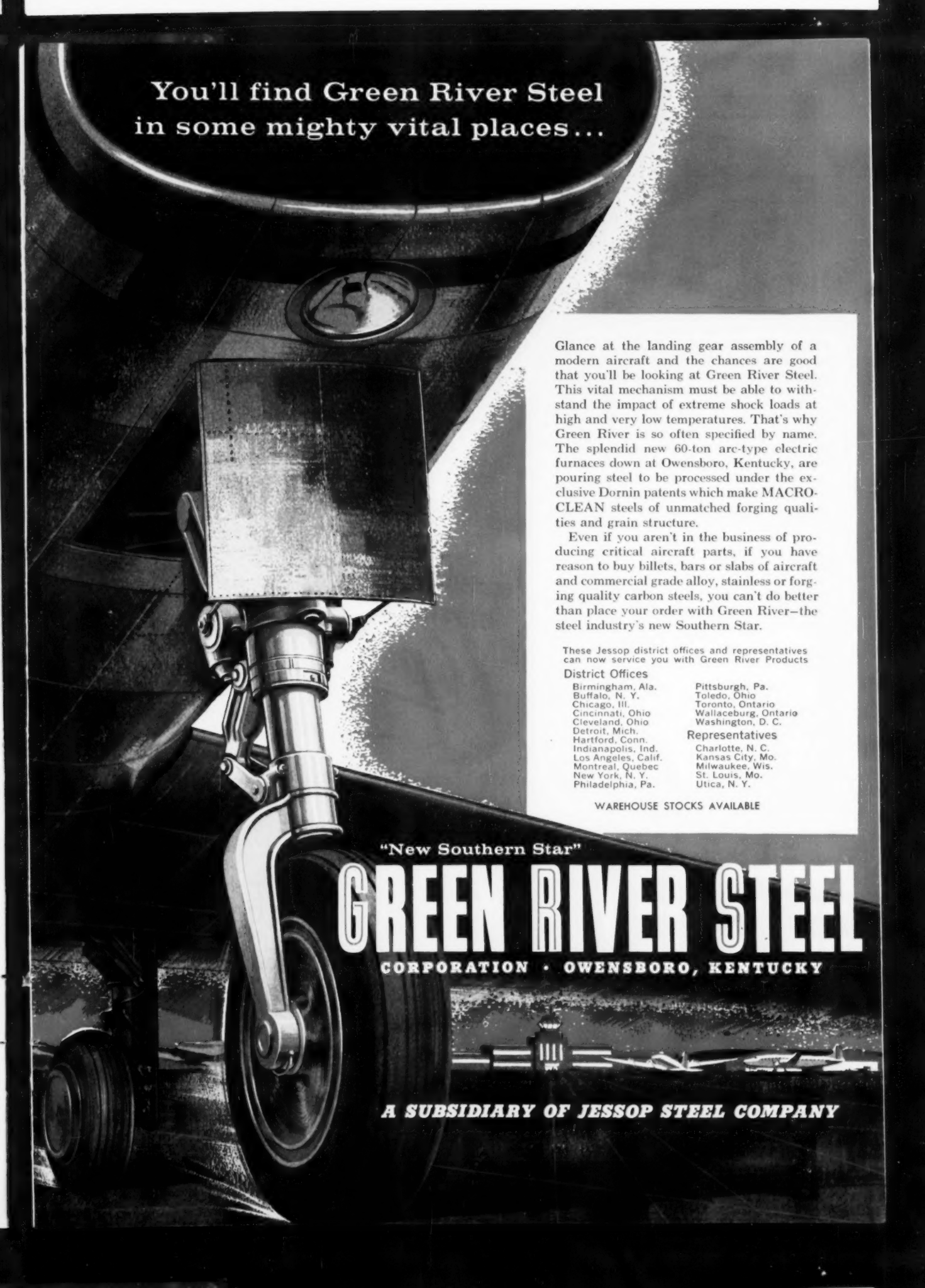
Wrapping It Up—The Dobeckmun Co., Cleveland, manufacturers of flexible packaging, gift wrap and metallic yarns, has merged with Dow Chemical Co. Merger proposal was ratified by holders of 93.5 pct of the 515,893 Dobeckmun common shares outstanding. Assets and business of Dobeckmun have been transferred to Dow which has assumed all Dobeckmun liabilities. Dobeckmun Co. will operate as a division of The Dow Chemical Co.

New Maple Leaf—Canada's first titanium pigment plant has been opened at Varennes, Quebec. The Canadian company, Titanium Pigments Ltd., is a subsidiary of National Lead Co. The plant has begun production, its output going to the Canadian paint, paper, rubber, plastics, roofing and floor covering industries. New operation provides employment to approximately 300 people.

Consolidating the Brass—Waltham Co. is constructing a \$5 million brass valve plant and a research and engineering center in Braintree, Mass. The two buildings are scheduled for completion late in 1958. This expansion will consolidate many of the company's operations presently performed in 18 buildings in Boston.



"Patience, board members—I expect Bently any minute now with this month's production report!"



You'll find Green River Steel
in some mighty vital places...

Glance at the landing gear assembly of a modern aircraft and the chances are good that you'll be looking at Green River Steel. This vital mechanism must be able to withstand the impact of extreme shock loads at high and very low temperatures. That's why Green River is so often specified by name. The splendid new 60-ton arc-type electric furnaces down at Owensboro, Kentucky, are pouring steel to be processed under the exclusive Dornin patents which make MACRO-CLEAN steels of unmatched forging qualities and grain structure.

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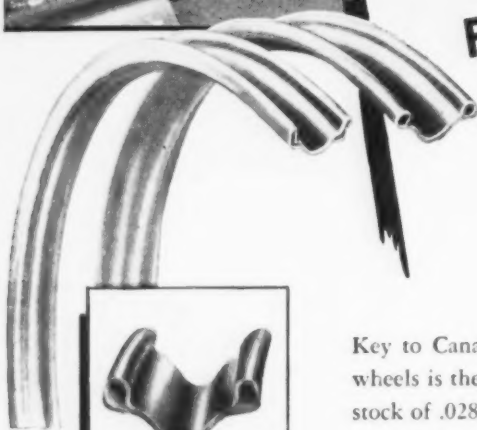
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METAL WORKING MACHINERY SINCE 1887

Bending Rolls Straightening Rolls Cold Roll Forming Machines
Slitting Lines Flying Shears and Saws Special Metalworking Equipment



P. V. Malloy, appointed vice president, operations, Kemet Co., Div. of Union Carbide Corp.

P. C. Sayres, elected vice president, Executive Dept., American Can Co.

P. W. Leming, elected executive vice president, Van Norman Machine Co.



W. T. Blair, vice president and treasurer, Sharon Steel Corp., elected to the board of directors.

H. D. Feltenstein, Jr., appointed financial vice president and chief financial officer, Lithium Corp. of America, Inc.

L. D. Deal, elected president, Lyon Metal Products, Inc., Aurora, Ill.; **A. W. Walan**, elected secretary and treasurer; **J. B. Gossett**, elected asst. treasurer.



P. H. Adams, appointed vice president, public relations, U. S. Steel Corp.



J. V. Boardman, named vice president and general manager, Green River Steel Corp., Owensboro, Ky.

A. B. Clow, named vice president, marketing, American Cyanamid Co.; **A. C. McAuliffe**, named vice president, engineering and construction.

J. L. Cotsworth, appointed staff manager, stainless steel, Chase Brass & Copper Co., Waterbury, Conn.

H. E. Dralle, appointed asst. to the vice president, Northeastern apparatus sales region, Westinghouse Electric Corp.



J. B. Riley, promoted to secretary and controller, Green River Steel Corp., Owensboro, Ky.

MEN IN METALWORKING

R. K. Stern, appointed president, Mid-Century Instrumatic Corp., New York.

J. W. Vogt, named manager, sales administration, appliance sales, Consumer Products Div., Westinghouse Electric Corp.

P. R. Christiansen, appointed district manager, sales, Memphis office, Granite City Steel Co.

Dr. W. K. Bock, appointed director, research, National Malleable & Steel Castings Co., Cleveland.

J. L. Lamont, appointed manager, technical services group, Metals Research Laboratories, Niagara Falls, N. Y.

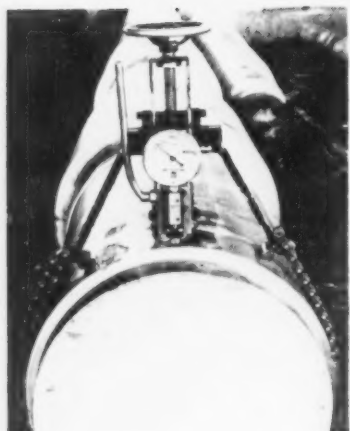


W. A. Anderson, elected vice president and general manager, Associated Spring of Puerto Rico, Inc.

Michael Bender, appointed metallurgist and welding engineer, Buflovak Equipment Div., Blaw-Knox Co., Buffalo, N. Y.

Robert Pittsley, promoted to magnesium sales supervisor, Detroit office territory, The Dow Chemical Co., Detroit.

H. T. Pierpont, appointed manager, sales and member of the operating board, Electro-Chemical Div., Norton Co., Worcester, Mass.; **F. J. Rutland**, appointed manager,



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Solve quality control problems with the King Portable Brinell Hardness Tester. Take faster, more accurate hardness readings on heavy, odd-shaped metal parts without elaborate fixturing or cutting samples. The King Portable uses a 3000 kg. load on a 10 mm. ball with automatic relief. Intermediate loads as desired. This precision instrument saves handling and set-up time, and is so versatile, it soon pays for itself many times over. Weighs less than 30 pounds and makes guaranteed accurate tests anywhere.

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sales engineering; **F. B. Huke**, appointed manager, atomic product sales, Refractories Div.; **G. H. Powers**, promoted to manager, distribution, Refractories Div.



E. C. Leibig, elected president, Corhart Refractories Co., Inc., Louisville, Ky.

R. W. Holmes, becomes sales manager, Eastern Div., North, E. F. Houghton & Co., Worcester, Mass.; **L. R. Tharp**, becomes asst. sales manager, Detroit Sales Div.

W. E. Brandt, appointed asst. division superintendent, steel production, Fairless Works, U. S. Steel Corp., Morrisville, Pa.



J. W. Cox, appointed general superintendent, Duluth Works, American Steel & Wire Div., U. S. Steel Corp.

S. E. Tyson, appointed metallurgist, stainless steels, The Carpenter Steel Co., Reading, Pa.

H. A. Steinherz, promoted to manager, engineering and development, NRC Equipment Corp.

V. H. Lindberg, named division superintendent, Structural Rolling Div., U. S. Steel's South Works.

Wilfred Quinter, promoted to production foreman, and **James Wallace**, promoted to inspection and quality control supervisor, Northwestern Tool & Engineering Co., Dayton, O.

E. S. Fraser, named asst. general sales manager, Chicago headquarters, Chicago Bridge & Iron Co.

R. J. Miller, appointed chief engineer, Tractor & Implement Div., Ford Motor Co.

L. W. Cuaningham, promoted to Southern region sales manager, Kelite Corp.



K. P. Campbell, appointed general superintendent, operations, Houston plant, Sheffield Div., Armco Steel Corp.

Louis Dusberger, named asst. regional manager, Chicago, Detroit, Milwaukee and Indianapolis district offices, Ceco Steel Products Corp., Chicago; **Ward Dobbin**, named asst. manager, structural products; **Claude Carmichael**, named asst. manager, window and door products.

W. J. Gurtner, elected controller and treasurer, A. M. Byers Co., Pittsburgh.

Finn Jensen, named district sales manager, Celfor Tool Div., Avild-

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Four ways where Sems can cut assembly costs

2

Speeds assembly and increases worker productivity.

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The permanently attached washer eliminates time-wasting fumbling and extra hand operations.

3

Prevents costly mistakes (washer cannot be forgotten or the wrong one used).

4

One unit to buy and inventory—screw and washer stock always in balance. Cuts ordering and billing time.

Here's the right combination for cutting costs on the assembly line.

Lamson & Sessions Sems eliminate extra time-wasting hand operations, assuring increased productivity. Sems take full advantage of power driver efficiency—there is no slow down while washers and screws are assembled.

Check the many advantages offered and you will decide it pays to standardize on Lamson & Sessions manufactured Sems.



sen Tools & Machines, Inc., Syracuse, N. Y. headquarters.

J. W. Rath, promoted to superintendent and **T. A. Thompson**, to asst. superintendent, Open Hearth Dept., Weirton Steel Co., Div. of National Steel Corp.

R. K. Dickson, appointed general manager, Fullerton, Calif. plant, Trent Tube Co., East Troy, Wis.

E. F. Kurzinski, named manager, sales development engineering, Air Products, Inc., Allentown, Pa.

L. E. Brion, Jr., elected executive vice president, Peter A. Frasse & Co., Inc., New York; **N. L. Hammond, Jr.**, appointed district manager, Philadelphia.

George Kepley, appointed district manager, Industrial Div., Beckley, W. Va. office, The Jeffrey Mfg. Co., Columbus, O.

Richard Relf, appointed Detroit regional sales manager, Industrial Div., Gould-National Batteries, Inc., Trenton, N. J.

Dr. R. B. Costello, appointed asst. manager, Materials Dept., Aerophysics Development Corp., Santa Barbara, Calif., subsidiary of Curtiss-Wright Corp.



C. L. Lloyd, Jr., named general superintendent, services, Houston plant, Sheffield Div., Armco Steel Corp.

Following appointments are within the Spang-Howarduct Div., Melrose Park, Ill., The National Supply Co. **R. W. Clifton**, named plant manager; **Leo Rapp**, named purchasing agent, and **R. B. Street**, named plant accountant.



J. A. Graham, appointed manager, mining tool sales, The Carmet Div., Allegheny Ludlum Steel Corp.

R. H. Vredenburg, appointed manager, Eastern operations, Marketing Div., American Electronics, Inc.

H. A. Ey, Jr., appointed manager, cleaner sales, Hanson-Van



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Designed and Built By Loftus

Late in 1956, the largest open hearth furnace in the world was tapped at Weirton Steel Company, Division of National Steel Corp., Weirton, W. Va.

Designed and built by Loftus Engineering Corp., this huge furnace has a rated capacity of 600 tons, is approximately 111 feet long by 30 feet wide, and construction was completed in less than a

year. Operation is simple since the furnace is equipped with full automatic control.

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SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

NUMBER III—Lustrous, Corrosion-Resistant Finishing with Chemical Polishing Iridite

WHAT IS IRIDITE?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are widely accepted throughout industry as an economical means of providing corrosion protection, a good base for paint and decorative finishes for non-ferrous metals. Certain of these coatings also possess chemical polishing abilities that have luster-producing, as well as corrosion-inhibiting, effects on zinc and cadmium plate, zinc die castings and copper alloys. However, continued developments in this field have been so rapid that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this discussion of the many ways in which this chemical polishing characteristic can be used in final finishing or pre-plating treatments to produce a lustrous appearance with distinct display and sales appeal and appreciable savings in cost. Report I on decorative, corrosion-resistant finishes and Report II on paint base corrosion-resistant finishes are available on request.

The degree of luster possible on a surface is a function of the degree to which the surface can be smoothed. Leveling to provide a smooth surface can be achieved by mechanical or chemical means, or a combination of these, depending upon the luster desired and the original condition of the metal. Chemical polishing effectively imparts luster otherwise difficult and costly to obtain. For this reason, it is often used to supplement or entirely replace mechanical polishing, depending upon the application and the original condition of the metal. Chemical polishing has the additional advantage of providing overall treatment of the submerged part. It reaches into even the deepest corners and recesses that are otherwise inaccessible. Certain of the Iridites are specifically designed to perform this chemical polishing operation. Also, they provide corrosion protection as do all Iridites, thus may be used as a final finish or a pre-plating polish.

If Iridite is to be used as a final finish, in contrast to pre-plating treatment, the chromate conversion coating generated is allowed to remain, providing good corrosion resistance. Color inherent in these Iridite films ranges from a yellow cast to yellow iridescent. These coatings may be used without further treatment where this color is acceptable and good corrosion resistance is desired. Further, these basic coatings can be tinted by dyeing. Among the dye tints available are shades of red, yellow, blue and green. If desirable, the basic coatings can also be modified by a bleach dip leaving a clear bright or blue iridescent finish. In all cases bleaching reduces corrosion resistance.

As examples of this type of final finishing, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, lustrous chemical polishing of the as-cast surface of zinc die castings. Thus, in many cases, sizeable savings in finishing cost are realized by elimination of plating costs. This economical method can be used on tools, appliance parts, toy pistols, locks and many other small castings. Another example is the treatment of copper and brass parts, such as welding tips, to eliminate buffing and provide additional corrosion resistance. In many cases, handling costs are reduced appreciably by replacing piece-part handling with bulk processing. Still another example of the use of this chemical polishing and protective quality of Iridite is a simple system of zinc plate, Iridite and clear lacquer instead of more costly electroplated finishes. Typical of this type of lustrous finish are builders hardware and wire goods.

As a pre-plating treatment, in contrast to final finishes, Iridite can be used to chemically polish zinc die castings or copper prior to plating. In such cases, Iridite should be applied as an in-process step, so that the protective film is removed before the plating cycle. The savings in hand-

ling, material and labor costs are obvious. This process has made it practical to plate chrome directly over copper on steel, conserving nickel, yet producing a lustrous chrome finish. Used after stripping faulty plate in reprocessing zinc die castings, Iridite restores luster to the casting, thus making possible replating without blistering.

Other Iridite finishes are available to produce maximum corrosion resistance, a wide variety of decorative finishes and excellent bases for paint on all commercial forms of the more commonly used non-ferrous metals. As a final finish, appearance ranges from clear bright to olive drab and brown and many films can be bleached or dyed. As a paint base Iridite provides excellent initial and retentive paint adhesion and a self-healing property which protects bare metal if exposed by scratching. Iridites have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of their top performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product demands the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.

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Presque Isle, Michigan
—where Chemstone operates quarries and plants for 5 major steel companies under a long term management contract.

Marblehead, Ohio
—a 3000-acre operation including quarries, plants, rail-dock-boat facilities.

Cleveland, Ohio
—Chemstone main office, technical sales, customer service.

Pittsburgh, Pa.
—where Neville Lime Co. handles technical sales and service.

Menlo Park, N. J.
—Research Center where metallurgical limestone work never ceases.

Strasburg, Va.
—site of plants, and deposits that are among the highest calcium-content limestones in the U. S.

The map and legends show why you can buy fluxstone to better advantage from Chemstone.

1. Dependable Deliveries—Chemstone is big, in ratio to steel itself. Multi-plant set-up, great capacity, integrated shipping facilities mean fast, sure deliveries to meet steel mill schedules.
2. Finest Quality Fluxstone—noted for uniformity of size, strict adherence to specifications, controlled top quality that is time-honored in the trade.
3. Technical Service, Research—skilled help from steel-wise technologists wherever needed.

Chemstone—and its parent company, Minerals & Chemicals Corporation of America—is geared to give steelmakers full service. Your inquiry is invited.



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CORPORATION OF AMERICA

Pittsburgh, Pa. Representative:
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Oliver Building

Winkle-Munning Co., Grand Rapids, Mich. headquarters.

J. J. Balint, promoted to buyer, Purchasing Dept., Pittsburgh Steel Co.



Robert Bevis, promoted to asst. sales manager, domestic sales, The Cincinnati Milling Machine Co.



J. E. Watson, named chief engineer, conventional gages, Gage Div., Pratt & Whitney Co.

OBITUARIES

W. I. Bright, 73, former president, Alabama Paper & Metal Co.

R. J. White, former auditor, U. S. Steel's Tennessee Coal & Iron Div.

R. S. Rose, Boston district manager, Latrobe Steel Co.

J. H. Drennen, 49, chief hydraulics engineer, Commercial Shearing & Stamping Co.

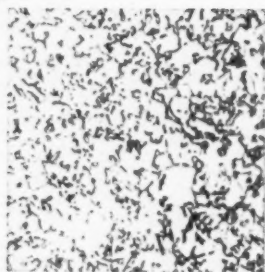
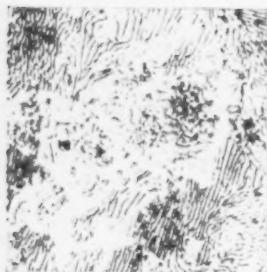
W. J. Magee, 68, retired treasurer and director, Norton Co.,

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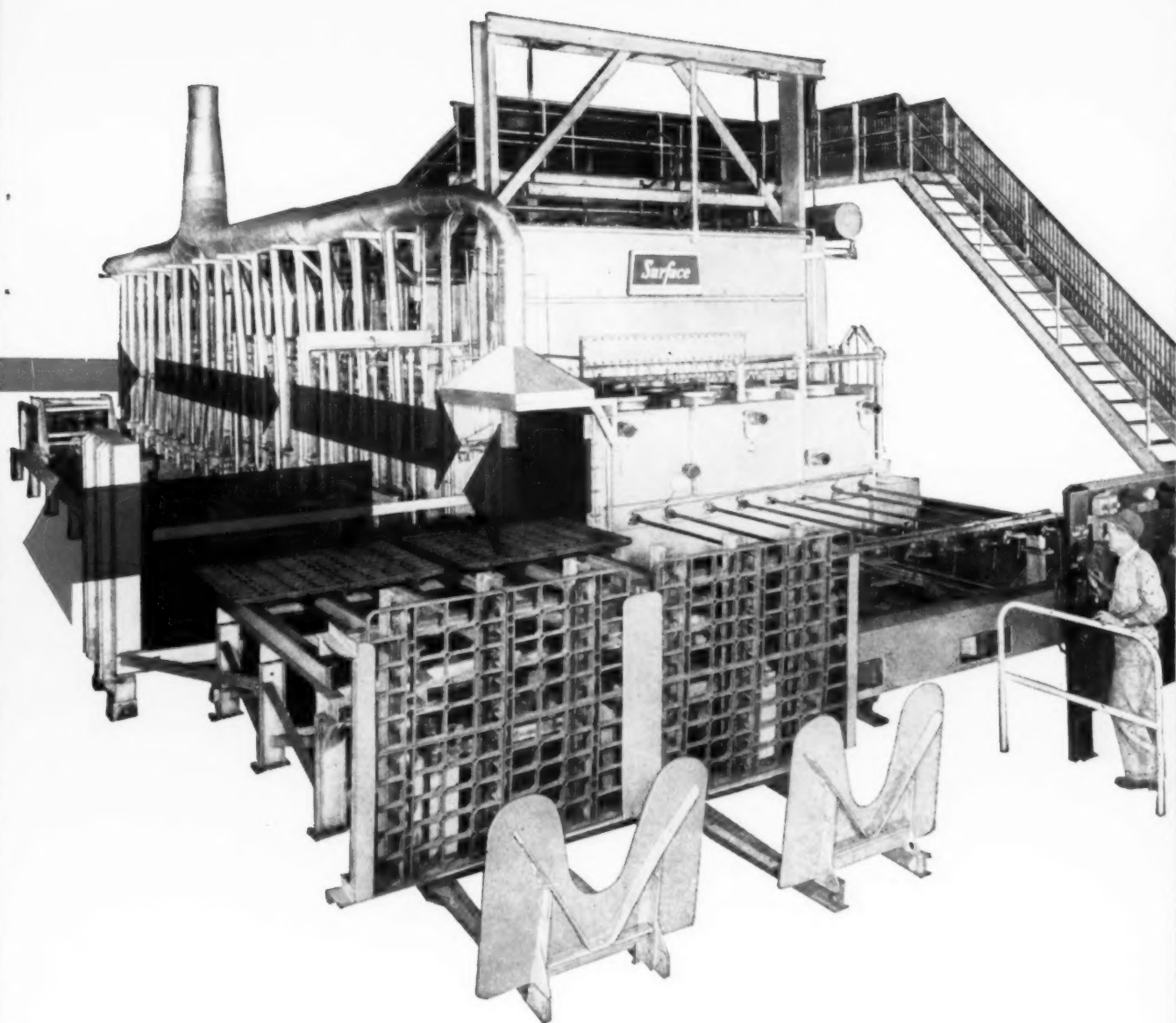
■ This steel mill easily meets the steadily tightened specifications of customers who demand stock with good surface finish, no "decarb," and uniform microstructures suitable for cold forming and automatic machining.

They do it by combining annealing and carbon restoration in a Surface continuous furnace. They get all the flexibility of cycle control they need with 6 zones, individually controlled. An RX[®] gas generator keeps the carbon potential of the furnace atmosphere in balance with the steels being treated. Automatic dew point recorders provide a continuous check on the atmosphere.

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Again, Surface engineering transforms difficult specifications into profitable opportunities.

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you can meet these specifications:

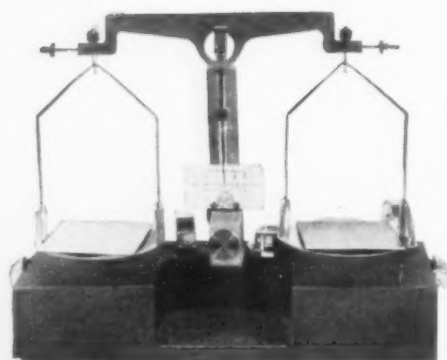
CYCLE ONE (sub-critical anneal)		CYCLE TWO (over-critical anneal)	
STEEL (AISI)	MAXIMUM-BRINELL	STEEL (AISI)	MAXIMUM-BRINELL
4042	160	4037	151
4140	170	4140	174
5140	166	8127	148
8740	170	8740	174

Cycle One production must show spheroidized structure. Cycle Two must show lamellar pearlite structure. Brinell hardness after annealing.

wherever heat is used in industry



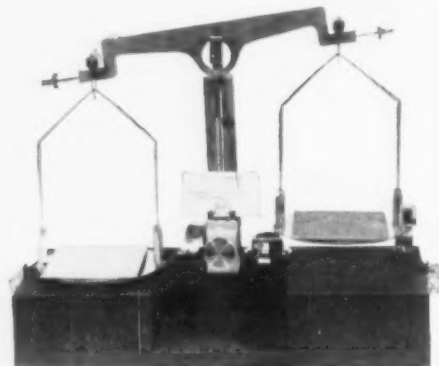
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NO WEIGHT DIFFERENCE. Two identical panels of low-carbon sheet steel were used. They balanced the scale.



RODINE MINIMIZES ACID ATTACK. Each panel was placed in a beaker containing 10% by volume of 66° Bé sulfuric acid at 160 F. The acid in the right-hand beaker was uninhibited. The acid in the left-hand beaker was inhibited with Rodine 82, 1% by volume of the concentrated acid. There was little or no hydrogen evolution in this beaker . . . Rodine retarded the attack of the acid on the base metal.



RODINE SAVES METAL. Both panels were removed from the acid pickle solutions after 5 minutes. The one pickled in the uninhibited acid had lost 1.4% of its original weight. The one pickled in the Rodine-inhibited acid had lost only 0.001%. This represents a saving of 26 lb. of steel for each ton pickled; and a simultaneous saving of nearly 50 lb. of 66° Bé sulfuric acid when Rodine is used to inhibit the acid.

ACP Rodine®

SAVES ACID, SAVES METAL—

GIVES YOU MORE

STEEL TO SELL

With ACP Rodine as the pickling acid inhibitor, you use less acid and have more steel to sell. Up to 50 lb. of acid is saved per ton of steel pickled and up to 26 lb. of steel. Fuming is practically eliminated. Formation of blisters and embrittlement is minimized. Costs of charging and cleaning of pickle baths are reduced—baths can be operated longer, and less acid is required to keep them at desired concentration. There are fewer rejects—steel pickled in acid inhibited with Rodine has uniformly clean, bright surfaces, free of pits, blisters and smut.

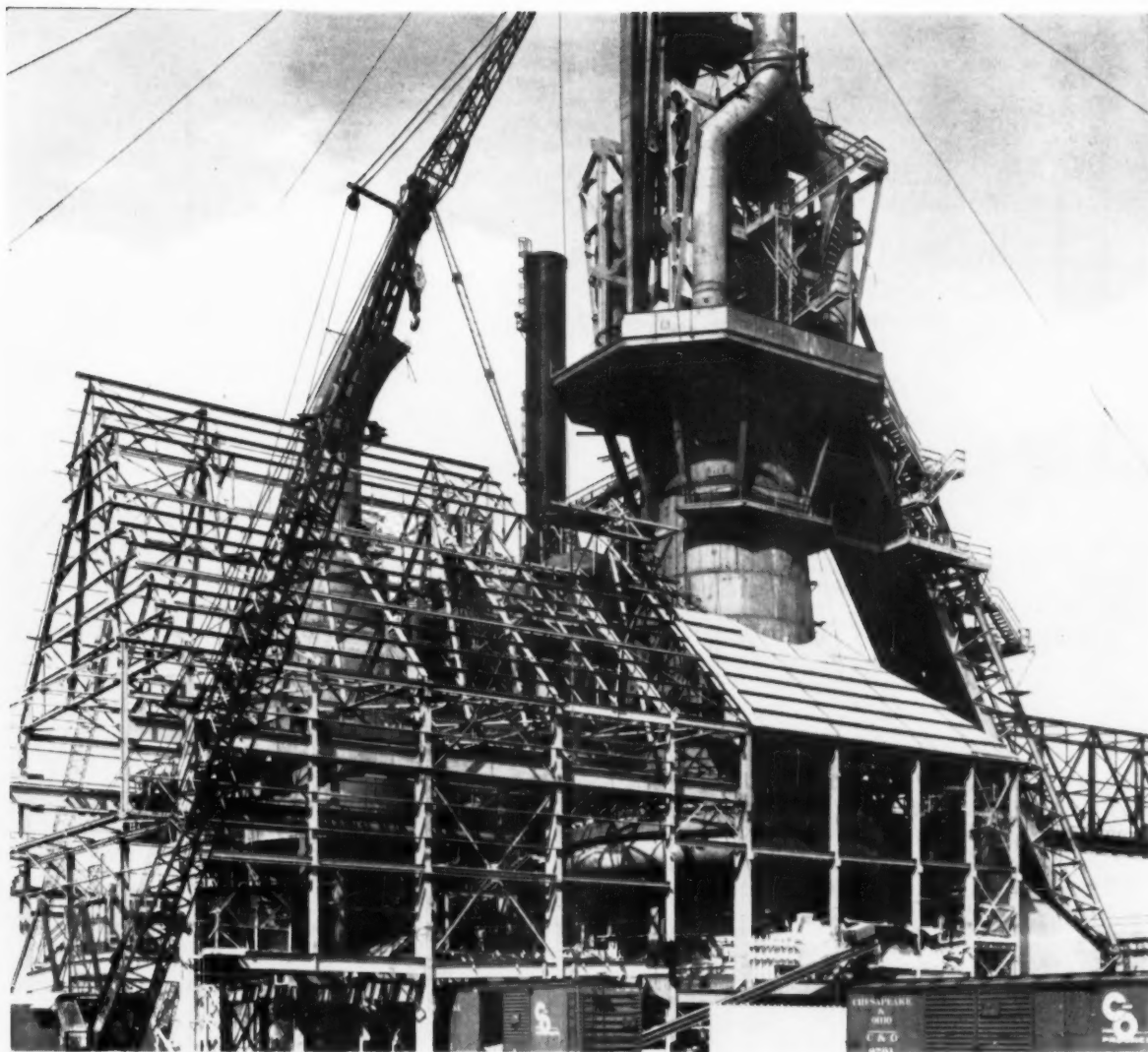


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New Chemical Horizons for Industry and Agriculture





ON THE BUILD: New process, new plants add to U. S. steelmaking capacity. (McLouth Steel photo)

Steelmaking Plans For Tomorrow

By P. M. Unterweiser—Metallurgical Editor

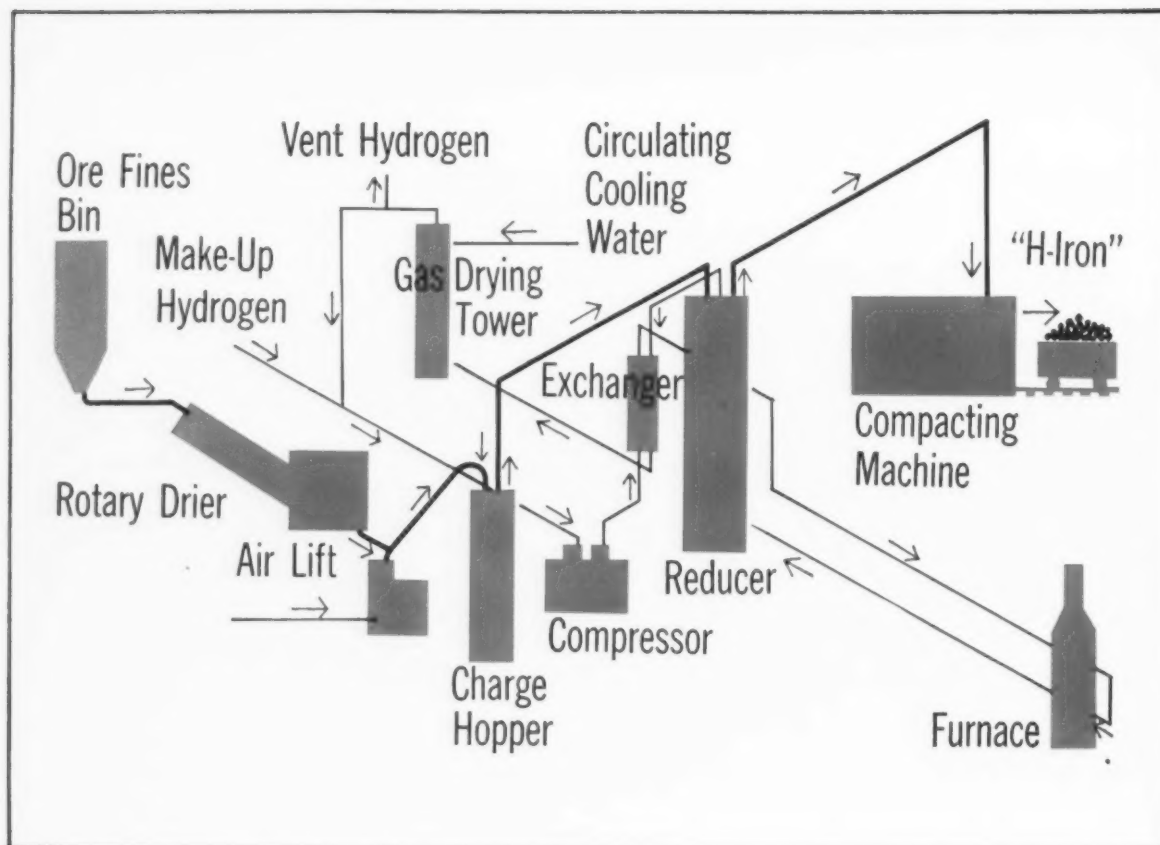
This is the year of the Bessemer centenary. But from the standpoint of better steelmaking, it's been a year with a bumper crop of new developments, new processes.

Many of them can influence the future of metalworking. Will they affect you?

■ When Dr. J. B. Austin recently testified before a Senate committee, he was speaking quite properly on behalf of his own employer—the United States Steel Corp. But many of the statements he made about the role of research—the search for “better processes and better products” in steel—might well apply to the entire industry.

The kind of research Dr. Austin described for the Senators was primarily the laboratory variety of problem solving. Whether applied or fundamental, this brand of research presents a vital half of the total picture. In the steel industry, the total problem of research is actually two-pronged.

Key Questions—First, there is



H-IRON PROCESS: With ores of the right size and quality plus a cheap source of natural gas, this new

direct reduction process shows great promise. For some, it may point the way to greater capacity.

the complicated business of solving a particular problem. Assuming you're successful, there's still a second phase: knowing what to do with the solution.

Is it practical? Economical? Technically sound? Adaptable? Time-saving? Labor-saving? Competitive?

These are some of the pointed questions aimed at current solutions—the new developments and processes in steelmaking and ferrous metallurgy. Certainly, the past year has produced a bumper crop. But while it is pleasant to contemplate the progress that's being made, it is sobering to also recognize the headaches that inevitably go along for the ride.

The steelmakers and their experts have been hard pressed to evaluate each new development. It's been a mighty strenuous business.

But the pointed questions must be answered—and as quickly as possible.

Direct Reduction—In a dynamic industry, delay can sometimes prove as damaging as a wrong decision. The game of technological progress doesn't provide for rest periods. You either carry the ball or prepare to mourn at the goal posts.

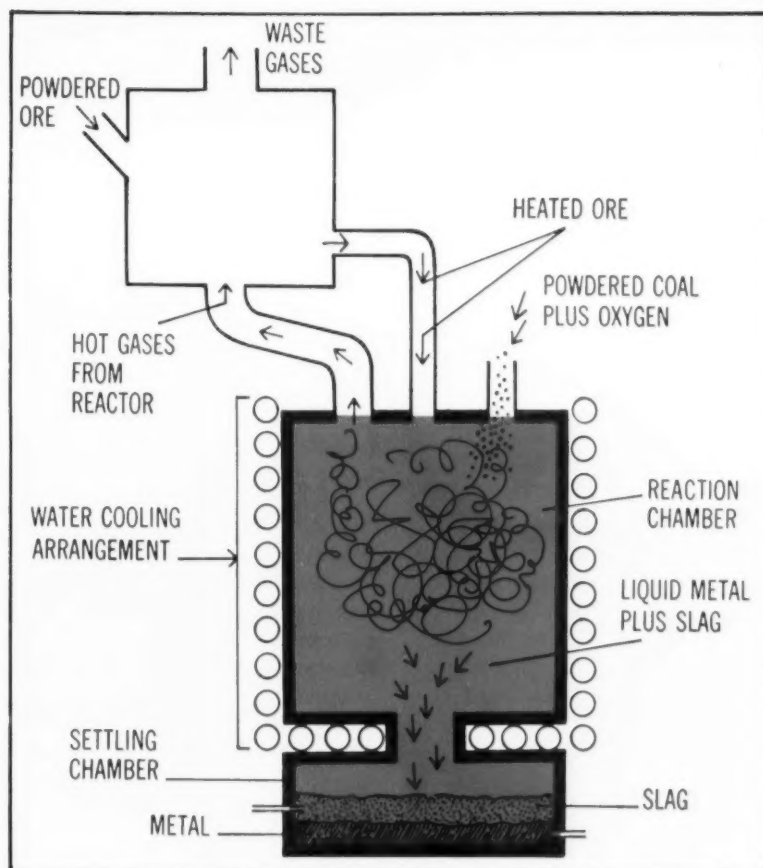
Take the problem of the direct reduction of iron ores. Essentially, it's an attempt to circumvent the blast furnace and show a greater profit. There have been many such attempts—some attractive, some zany.

Both—as a rule—admit to a tiny limitation here and there. Both invariably reach the pilot plant stage. Both publish claims intended to entice the steelmaker. How does he sort the fish from the fowl?

Traveling Team—Usually, he prepares for such contingencies by organizing his own team of experts. The team keeps its suitcase packed the year around. Its ear is attuned to the call of the pilot plant. And it is quick to respond whether the call comes from Paducah or Pago-Pago.

A few years ago, the team was hot on the trail of the Hoganas process, the Madaras process, the Bassett process, the Sturzelberg process, the Humboldt process, the Kalling process, and half a dozen others. These trails were all well blazed and, to some extent, are still being traveled.

But there is always something new to attract the team's attention. This past year, for example, there was the H-Iron process and "Cyclo-steel." These were the major calls.



BRITISH DEVELOPMENT: "Cyclosteel" process is designed to make steel directly from iron ore. New, it's still in the pilot plant stage.

There was also the widespread adoption of oxygen steelmaking—a matter of real importance. But its singular success and acceptance has already established it in the fold of commercial practice.

The Major Calls—The H-Iron process is sponsored jointly by Hydrocarbon Research, Inc., and Bethlehem Steel Co. What it does—does efficiently—is directly reduce iron ore fines with hydrogen at relatively low temperatures and high pressures to produce metallic iron.

The process' industrial potential is highly attractive. In fact, by now it is doubtful whether there still remains a team of steelmaking experts on this side of the Atlantic that hasn't looked in on Hydrocarbon's Trenton, N. J., pilot plant. Just about everybody has made the pilgrimage.

A cheap and versatile process for making hydrogen is the link which led ultimately to H-Iron. By economically providing metallic iron from fines, it may offer the steel industry a valuable lift toward expanding its capacity.

Within Limits—Still, it is fairly safe to predict that H-Iron will never replace all blast furnaces. The inherent limitations of the process make that abundantly clear. It can process "suitable" ores only. By "suitable" is meant ores with a relatively low percentage of "inerts"—i.e. manganese and silicon.

There are many usable ores that the H-Iron process cannot handle satisfactorily. This is not so much a limitation of the process as it is a simple fact of chemistry. And yet it is inevitable that all of these usable ores will be processed by ways other than direct reduction.

H-Iron at Work—Assuming that the ore size and quality are right and that a cheap source of natural gas is available, here's how the H-Iron process works:

Iron ore fines are first fed to a rotary ore dryer which serves a dual purpose. It removes almost all moisture and, at the same time, preheats the ore to a suitable reduction temperature.

This reduction temperature—about 900°F—is a vitally important detail. It is low enough to prevent the ore from becoming "tacky" and losing mobility.

Properly preheated, the fines are pneumatically transferred to a vertical charge hopper. With the ore temperature just below 900°F, hydrogen is introduced under pressure. When the charge hopper is full, it is pressured to a level that is slightly higher than that in the reduction vessel—the next step in the line.

Helpful Hydrogen—The heart of the process lies in the reduction vessel. It is here that the circulating hydrogen gas combines with the oxygen present in the iron ore.

The combined hydrogen and oxygen form water which, because of the heat in the vessel, takes the vapor phase. What is left is metallic iron and a small percentage of impurities which do not react with hydrogen.

Water vapor is removed from unreacted hydrogen. Make-up hydrogen is then added, and a circulating compressor returns dried hydrogen to the reducer. Back in the reducer the hydrogen is again ready to produce more iron.

Enter The British—All of this is a far cry from "Cyclosteel" which isn't interested in making iron in the first place. Stripped of frills, it wants to get directly to the business of making steel.

"Cyclosteel"—a relative newcomer to the American scene—is British born and bred. Its development costs were footed by the

membership of the British Iron and Steel Research Association.

Because BISRA membership is pretty much limited to British steel producers, the call of the "Cyclo-steel" pilot plant was geographically limited in scope and intensity. Not that it wasn't heard clearly in New York, Erie, Pittsburgh, Chicago, and even Los Angeles. It was.

Not All Clear—But many of the American teams were not in a position to heed it without the protocol and refinement of a written invitation. How many of these invitations were issued—and to whom—is not a matter of public record. The British are known to be conservative and, at times, even reticent. So that even today many of the details of the "Cyclosteel" process have not been completely observed nor thoroughly digested by the swarm of itinerant American experts.

Still, the word gets around. Sir Charles Goodeve, BISRA's director, dropped the hint in his address commemorating the Bessemer centenary early this year. From there on, it was simply a matter of catch-as-catch-can.

The Modest Details—The Iron Age published one of the few, and possibly the first complete report on the "Cyclosteel" process to appear in the U. S. Since its appearance (issue of May 23, 1957, p. 129), a modest amount of additional detail has sifted through.

In a general way, the accompanying diagram spells out the operations of the "Cyclosteel" process.

Ore is preheated in a fluidized bed to a temperature just below the point at which it becomes tacky. It is then injected into a reaction chamber filled with reducing gas. The gas is produced by burning any grade of pulverized coal with oxygen.

Inside the reaction chamber, the combination of coal, oxygen, and carbon dioxide produce the reducing gas—carbon monoxide. Carbon monoxide, in turn, reduces the

ore to provide iron and carbon dioxide.

Fast And Final—Because the fuel and the ore are introduced in the form of finely divided particles, reaction time is almost instantaneous. Ore reduction is accomplished in a matter of a few seconds.

The combination of cyclonic action and gravity help to separate the precipitated products from the gaseous atmosphere. Final separation of the metal from the slag takes place in a "setting" chamber.

Note from the diagram that provision is made to cool the reactor casing. A continuous supply of water is circulated through the pipes encircling the reactor casing and the bottom plate.

Chilling of the slag on the inside of the casing affords further protection from intense heat and the abrasion that results from a sliding charge.

Selling Points—To operate successfully, the "Cyclosteel" process must use a great deal of oxygen. But as the market for oxygen in steelmaking continues to grow, there should be increasing incentive for producing the gas in large quantities and at lower prices. If this

trend is followed, oxygen supply should not be a problem.

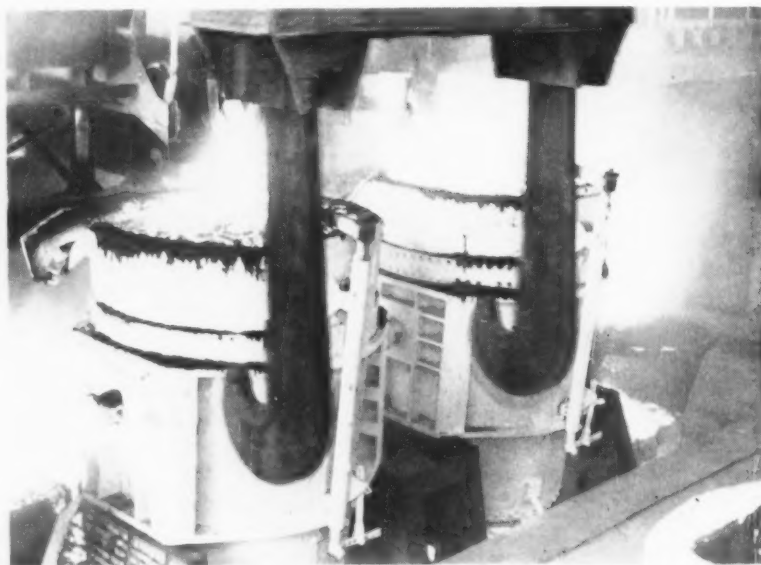
What are the selling points that make "Cyclosteel" particularly attractive? Significantly, it uses iron ore fines at a time when lump ores are becoming increasingly scarce.

In conventional practice, ore fines are now sintered for use in the blast furnace. The sintering operation involves expensive equipment and large capital expenditure. Coke ovens—another "must" in conventional steelmaking—are equally expensive. All of this accessory equipment occupies a lot of costly floor space.

It's "Unitized"—"Cyclosteel" solves all of these problems with a "unitized" setup. Also, it is likely that the steel produced by the process will be free of phosphorus. If sulphur tends to run high, lime injection may be tried. Current experiments are restricted to ores of low sulphur content.

Although sulphur content in steel has always been viewed as an important problem, interest in possible solutions has picked up considerably in the past year. There are at least three good reasons for the increasing interest.

First, hot metal with a very low



IN THE LADLE: These are conventional ladles. But in the future, even the ladle may take on new uses such as external desulphurization.

sulphur content is highly desirable from a metallurgical standpoint. Secondly, desulphurization increases pig iron output and lowers coke consumption in the blast furnace. Finally, low sulphur actually reduces the time required for refining hot metal.

Choice Of Methods—For these reasons, there is no quibbling about the very real advantages of desulphurization. At the moment, the key issue concerns the choice of a method for achieving the low sulphur content. There are a number of methods in the running.

One desulphurization process announced recently was developed at Battelle Memorial Institute and sponsored by Diamond Alkali Co. It uses caustic soda and other sodium compounds to reduce sulphur content in either liquid iron or steel. It claims to be able to do the job without damaging refractories or creating dangerous fume conditions.

As an extra added attraction, it also provides for the reduction of silicon, carbon, and phosphorus contents by the addition of oxygen.

Alkali Approach — This new Diamond Alkali process, according to Harry W. McQuaid, combines

speed with unusual flexibility. It can lower both silicon and sulphur contents simultaneously and in a matter of seconds. In test runs at Battelle, it managed to lower a sulphur content of 0.10 pct to below 0.02 pct in a few minutes.

This is by no means its low sulphur limit. Using caustic soda, it can readily achieve sulphur contents of less than 0.002 pct.

To accomplish these results, the process makes use of a reactor—cylindrical in shape and open at both ends. Hot metal is poured into the cylinder at one end. Heat is supplied by a gas burner at the other end.

Separate Layers—One advantage claimed is that the cylinder provides a large area of contact between the metal and the chemical reagent. When the cylinder is rotated, centrifugal action serves to separate gases, slag, and metal in distinct layers. The heavier metal clings to the walls of the container, protecting the refractory surfaces completely. The gases generated by chemical reaction are carried off by an exhaust system.

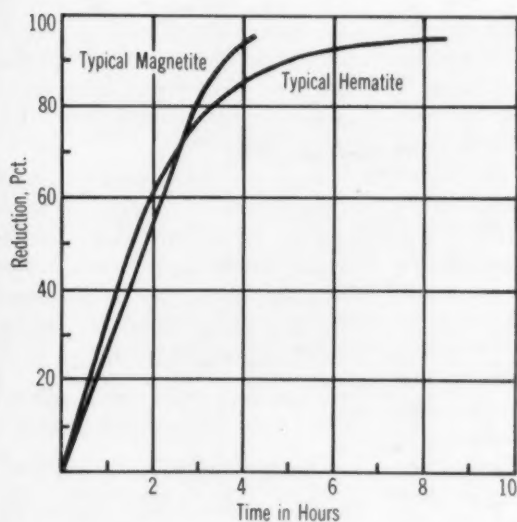
Movement of the liquid metal from one end to the other is made possible by a low refractory

shoulder on the inlet end of the cylinder. As liquid metal flows over the shoulder, it builds up a "head" with sufficient force to carry it toward the exit. The result is a relatively thin layer of metal covering the inside surface which moves continuously toward the outlet end where it is collected.

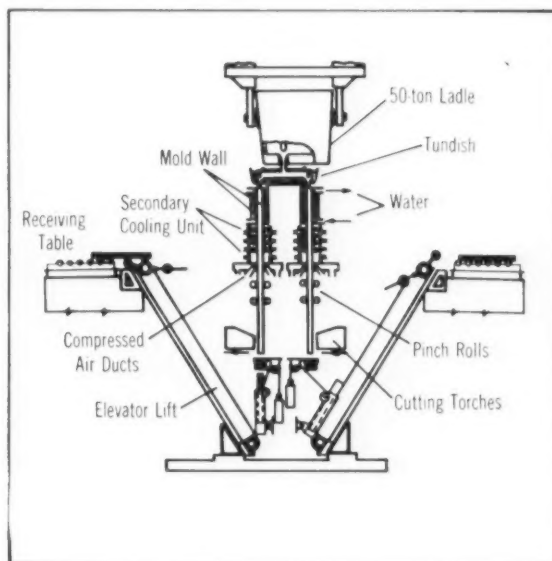
The Big Eight—The rate of axial travel is dependent in part on the "head" built up in the bath at the inlet end. This, in turn, depends on the rate at which the molten metal is poured into the reactor. In other words, the metal will be carried through the reactor as fast as it is introduced.

According to McQuaid, these are some of the important advantages of the Diamond Alkali reactor:

1. Very large area of contact between liquid metal and the chemical reagent.
2. Constant mixing under pressure of the reacting materials at point of contact.
3. Heat available to produce whatever temperature or reaction rate is desired.
4. Simultaneous separation according to specific gravities of liquids and gases, with a separation



REDUCTION RATES: Here are typical reduction rates attainable in practice with the H-Iron process.



RUSSIAN DESIGN: This continuous casting setup is reported to produce 35 tons of mild steel per hour.

Research in steel-making indicates an extremely healthy condition . . .

of metal and slag formed by the reaction and control of the gaseous reaction products.

5. Continuous or intermittent (batch) operation.

6. Can be operated in parallel or in series with present equipment without interference or loss in production time.

7. Very high production rate.

8. Low investment cost; low operating cost.

Some Lively Competition—With so impressive a list of advantages, you might imagine that all of the competition would be mowed right off the track. Although the future is still a question mark, this is certainly not the case at present.

A very lively competitor is a lime powder desulphurizing process developed by the French Institut de Recherches de la Siderurgie (IRDID). This process is reported to have cleared all of the pilot plant hurdles and is ready for full-scale production trials.

The lime powder process also makes use of a reactor for the hot metal. In this case, it is a ladle with a semi-conical hood. Lined with conventional refractory brick, the ladle's bottom is fitted with four tuyeres. These tuyeres are the heart of the process.

Lime Is Safe—Through them is blown a suspension of lime powder in either air or nitrogen. For a number of reasons, nitrogen is the preferred gas. In about 5 minutes, the sulphur content of a 12-ton heat of pig iron can be lowered from 0.10 pct to about 0.02 pct. A full description of the process is scheduled for publication in *THE IRON AGE* at a later date.

One obvious advantage of the lime powder process is its principal chemical reagent. Lime powder

isn't dangerous to use or to store in the plant. Still, the process does require additional capital equipment and involves some extra handling of hot metal.

According to the experts, these disadvantages are relatively minor when stacked against the anticipated advantages. While there are no known installations of the process in the U. S., one French steel producer is now setting up equipment designed to handle about 1000 tons of metal per day.

Make It Continuous—The continuous casting of steel is an evolutionary sequence of major and minor improvements that began with Sir Henry Bessemer. In one sense, that makes it fairly old business. What is new is the renewed interest the process has been receiving in the past year.

According to a recent Inland Steel Co. report, there are now "about 25 operating plants casting steel, most of which have been built in the past decade. None of these plants could be classified as large in terms of tonnages that are being processed by the major integrated steel plants."

Pioneer's Reward—Because of the almost endless array of problems encountered in the continuous casting of steel, only a relatively few pioneers have been willing to live with the process over the intervening years. Right now it appears that the patience is beginning to reap its just reward. That reward: acceptable quality and about a 10 pct increase in yield over conventional ingot practice.

Inland now reports considerable success in the casting of killed, semi-killed, and rimming steels of low carbon content. Canada's Atlas Steels, Ltd. is now getting good results with both stainless and tool steel grades. And the Soviet Union, never reluctant to sing its own praise, claims to have two full-scale plants turning out continuously-cast, mild steel at a rate of 35 tons per hour.

While there are countless varia-

tions in the design of individual continuous casting equipment, the sequence of operations is basic. Molten metal is poured from a tilting ladle into a tundish. From there, the metal flows into a cooled mold.

Spraying Is Critical—In many cases, the mold is made of copper and is water-cooled. Some mechanical action is almost always provided in order to guarantee continuous movement of the cast log. Spray cooling of the log is frequently the most critical operation of the entire process.

With the prospect of higher yields due to elimination of hot top and butt discard, interest in the continuous casting of steels is bound to enlarge with each new technological improvement. But higher yield is not the only inducement.

Continuous-cast cut lengths can be adjusted to fit the customer's order without waste. "Shorts"—along with their needless expense—are eliminated.

The Healthy Condition—With these savings comes the advantage of being able to cast slabs that are dimensionally ideal for the blooming mill. In some cases, it is conceivable that both the blooming mill and soaking pit installations can be entirely eliminated. If so, this would provide a tremendous advantage in terms of reduced capital investment and lower operating costs.

Even this abbreviated review of some aspects of progress in steel-making serves to indicate an extremely healthy condition. Not only is there plenty of action, there's also plenty of suspense—waiting to see what's likely to come next.

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HIGHER AND HOTTER: Supersonic aircraft like these F-102A Convairs call for many complex castings.

Combined Methods Lick Casting Problems

Here's a fresh approach to problem castings: instead of looking at them from a standpoint of strictly one process or another, try using just the best features of each.

Separate benefits tend to be cumulative; look what happened when several techniques were joined on an "impossible" job. Today, it's a routine item.

■ Despite the host of new foundry developments over the past decade or so, the foundryman finds himself wrestling with more problem castings today than ever before. And, more out of habit than anything else, he usually looks at each problem piece in terms of a particular process. Or, he tries one method and then another until the best compromise is found, then uses that method from start to finish.

Fundamentally, there's nothing wrong with this approach. It works more times than not. But sometimes there's a casting that won't quite conform, one where costs or rejects are so high by whatever process that it's finally written off as impossible.

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method and a little from that, combining the attributes of several processes into a single scheme. And it's taking a lot of castings out of the "impossible" category and making them a matter of routine production.

Case In Point—A good example of how it works is a part currently being cast by the Foundry Products Div., Cooper Alloy Corp., Hillside, N. J. The casting is for the main body of an afterburner fuel igniter valve on Pratt & Whitney's famed J-57 jet engine.

Early efforts to produce the casting met with little success. Part of the problem lay in the need for a tough, heat-resistant tool steel casting that can withstand elevated temperatures. Cooper Alloy 15A—a stainless steel with 1.5 pct C, 12 to 14 pct Cr, 1 pct Cb, 1 pct V and 1 pct Mo—proved a good choice. But the nature of the alloy makes repair of defects by welding impossible.

Because of its vital function on today's supersonic interceptors, the casting has to be defect-free—under X-ray, Zyglo and Magnaflux inspection.

Accuracy Required—And despite its complex shape, the part

has to be cast to close tolerances. Early attempts to machine off-center castings had shown the extra machining involved would be an expensive proposition. Chucking the irregular piece is in itself a difficult and time-consuming job.

Core molds were originally specified. But the odd-shaped pattern required can't be made with straight-line parting. Sand cores were designed, some with irregular partings, which could be inserted into the core mold to obtain the needed contours. There were five of these, one to be pasted in the cope section and four in the drag.

Aluminum pattern and core equipment was built and carefully checked. Sample castings were made and given a thorough layout and dimensional check. Any needed corrections were then made in the patterns and cores.

No Stone Unturned—In the initial casting effort, extremely careful controls were exercised. Cores were meticulously fitted and pasted in cope and drag sections, washed and dried. Both sand molds and cores had to be accurately matched at all points as the molds were assembled. Completed molds were closely inspected

before pouring for any visible mismatches, crushes or dirt particles. The metal was then poured at temperatures held within 25°F.

But there were still a number of shortcomings in these procedures; and, because of the rigid standards which had to be observed, rejects were high. Shifting or crushing of cores within the mold was one difficulty. Inexact core fitting was another.

One core in particular was a trouble spot. Running almost the entire length of the casting, it was partly in the cope and partly in the drag with extremely irregular parting. Closing over this core without crushing was a problem.

Only The Beginning—There were others. Molds and cores had to be very tightly rammed to prevent the least sagging. Because of the wearing and abrasive action of the sand on the patterns and core equipment, cores began to fit poorly after a comparatively short time. New equipment had to be made frequently, since it could be used only 1200 to 1500 times.

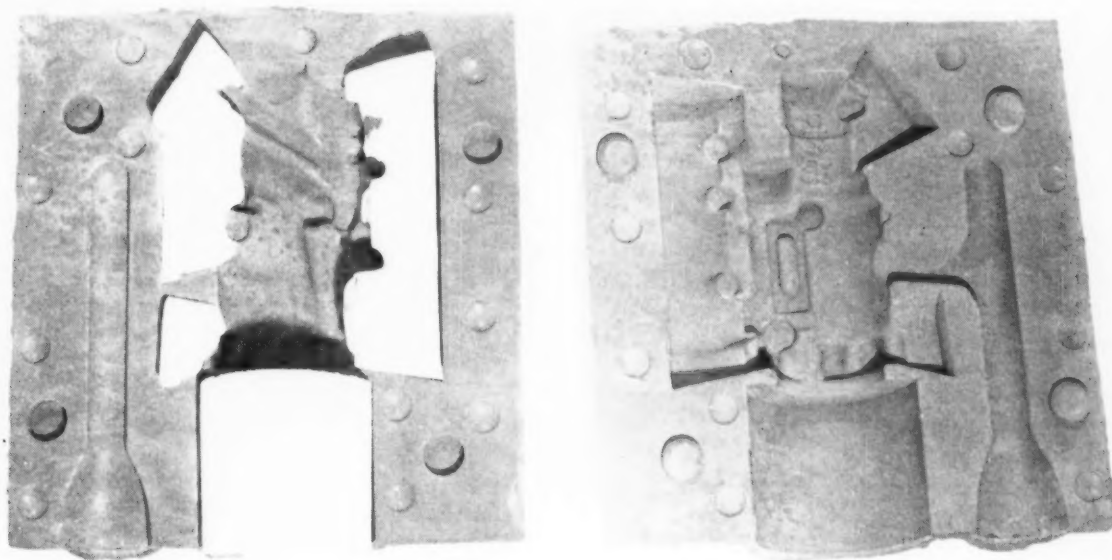
A large head was needed to properly feed the chunky casting. The result was a low yield per heat, since much of the metal poured was



FOUNDER'S NIGHTMARE: Casting for main body of igniter-valve is a tangle of projections and cavities; yet, thousands are being made.



GROUPED IN FLASK: Specially prepared sand is rammed around shell molds and gassed with CO₂ to provide rigid backing during pour.



READY TO CLOSE: Halves of shell mold are shown with shell cores and hot sleeve in place.

used in the head rather than the casting itself.

To raise the yield per heat, the first of three new developments was brought into play. This was an exothermic riser insert; a tube-like device commonly called a "hot sleeve." The hot sleeve is rammed up from commercially available material which is highly refractory and a good insulator.

The function of the sleeve is to permit a smaller amount of head or feed metal to remain molten longer. Without the hot sleeve a considerably larger head is needed; much of the cooling metal in direct contact with sand on the periphery serves merely as insulation. With the hot sleeve, more of the metal poured goes into the actual casting and less is required in the heat.

Big Increase—Using a hot sleeve 4 in. long, 4 in. OD and 2+ in. ID, Cooper Alloy engineers were able to increase the yield per 1550-lb heat from 42 castings to 70.

In the meantime tests were run to determine if it was possible to make the castings in shell molds and with shell cores. The firm, smooth and true surface of both shells and cores assure close core alignment, and the smoother finish requires less finish-machining.

A new shell-mold pattern was laid out in such a way that only four cores were needed, with all four in the drag only. This simplifies core-setting by eliminating the need for pasting cores in the cope.

The shell cores, which are made earlier on a shell core-making machine, are then fitted into the drag shell. The hot sleeve is inserted into a print made for this purpose. Paste is applied to the drag shell and the cope shell is put in place.

Special Press—The assembly is secured in a press developed at Cooper Alloy for the purpose of shell closing. It consists of a series of springs which clamp against the top and bottom of the shell mold at various points. The springs prevent warpage while the paste is hardening. Shells are then ready for pouring.

One chronic problem still remained. Because of the weight of the metal, the shell molds had to be backed to prevent runouts. Green sand backing was tried; but even when it was rammed as hard as possible, mold deflection still occurred. Shot backing was considered, but discarded because of the cost of reclaiming the shot.

Experimentally, CO₂ sand was

rammed into a flask around a shell mold and gassed. It did the trick, producing a rigid backing which completely prevents mold deflection. The operation proved quite simple in production, requiring only a CO₂ gas cylinder with a specially designed fork-shaped gassing wand. Seven shell molds are rammed up in one long flask. The gas is valved into the sand backing for about 40 seconds.

Now Routine—Combined use of the hot sleeve, shell molds and cores, and CO₂ has reduced the number of rejects 75 to 80 pct. And because shell molds and cores produce relatively smooth surface finishes with less finning, cleaning-room time has been cut from about 45 minutes to only 15 minutes per piece. Pattern and core box wear is lower; to date some 6000 castings have been made from one set.

The use of hot sleeves has increased the yield per heat, which results in faster production. In addition, the head contact area on the casting has been greatly reduced, which in turn lowers cut-off time. And because the shell-mold core and hot-sleeve assembly can be made beforehand and stock-piled, rush orders can now be met without strain.

Load Cells Weigh Molten Metal

Mechanical weighing systems are vulnerable to the rough service of weighing molten metal charges.

It's the unavoidable hot spillage, dirt, and grime that cause the abuse.

By mounting load cells under the weighing platform, you do away with mechanical linkage.

It makes a rugged electrical system look good for this job.

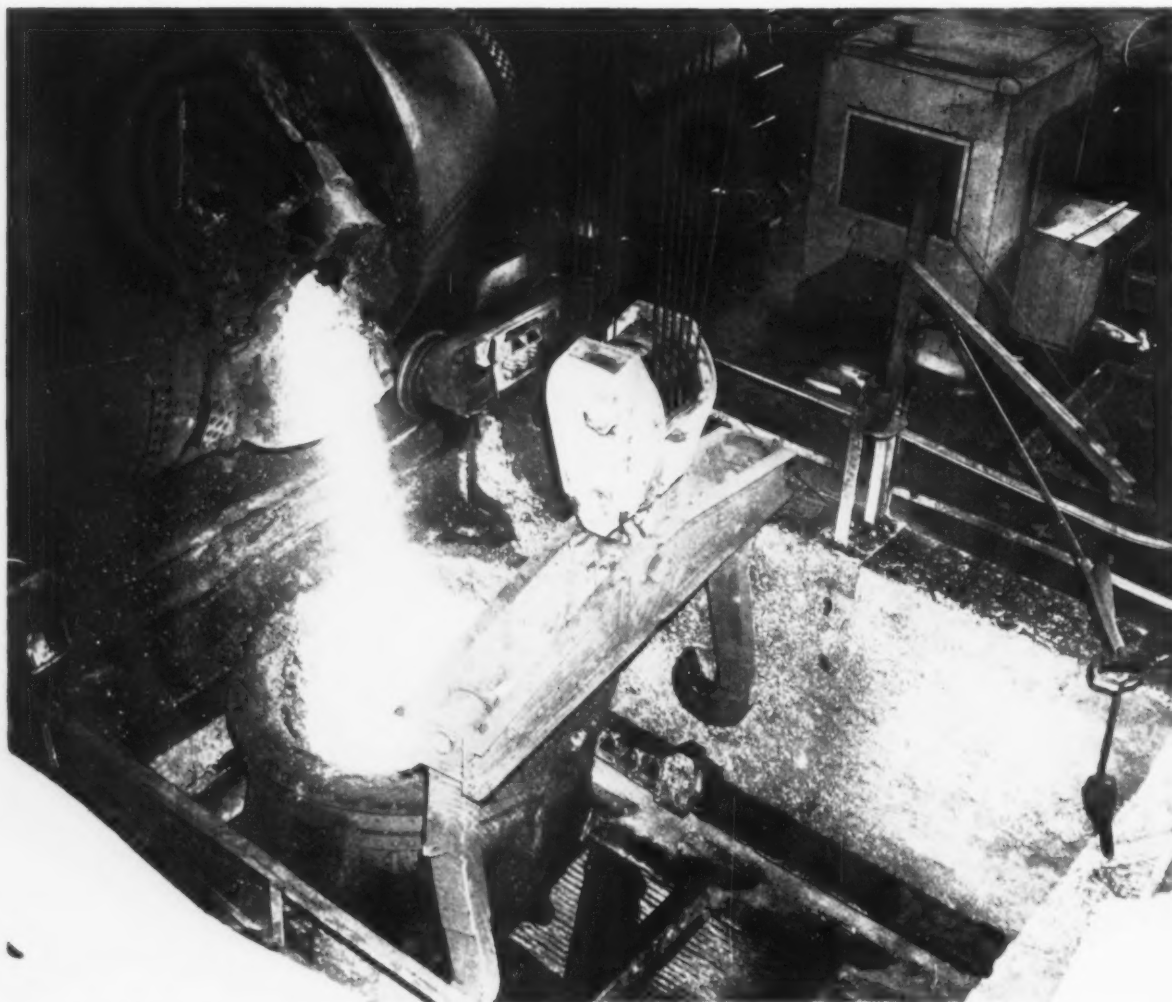
■ Electrical load cells are weighing hot metal charges for open-hearth furnaces. The substitution of these cells for the conventional beam and lever scale reduces the possibility of damage to weighing equipment at The Sheffield Div., Armco Steel Corp., Houston. Any damage that does occur can be repaired at lower cost and in less time.

Four In Parallel—The system uses four SR-4 load cells, made by the Electronics and Instrumentation Div., Baldwin-Lima-Hamilton Corp., Waltham, Mass. The cells,

each with a capacity of 100,000 lb., support an I-beam platform on which the ladle rests.

The operator controls the pouring of the hot charge in a booth at the side of the weighing platform. By watching the indicated reading on an instrument in the booth the operator knows the exact weight of hot metal in the ladle at any point in the pour.

With the beam and lever scale system that preceded the SR-4 cells, hot metal spills destroyed the scale beams. Replacing the beams



HOT CHARGE WEIGHING: Load cells supporting I-beam platform send impulses to indicator in control

booth at upper right. Position of load cells under platform protects from spillage of metal.

was expensive and time consuming with the weighing system out of service for sustained periods.

Natural Protection—The compactness of the SR-4 cells permits them to be mounted where hot metal spills will not reach them. Situated on pedestals in the bottom of the weighing pit, they are above the reach of any but an exceptionally large and unlikely flow of metal in the pit.

No closer to the ladle than 4 ft 10 in. at their nearest locations and partially shielded by the I-beam platform, the cells are beyond the reach of direct overflow. Metal housings protect the cells from damage by splatter from spilled metal.

Because the cells weigh and register their readings electrically rather than mechanically their locations may be governed by safety requirements and convenience rather than by mechanical limits.

The location of properly calibrated cells has no effect on continuing accuracy. The cells are sealed against moisture and corrosion and are temperature compensated.

The readings are transmitted by electrical impulse through cables rather than through linkages. The transmission system is impervious to errors caused by wear and incrustations of dirt, lubricants, etc.

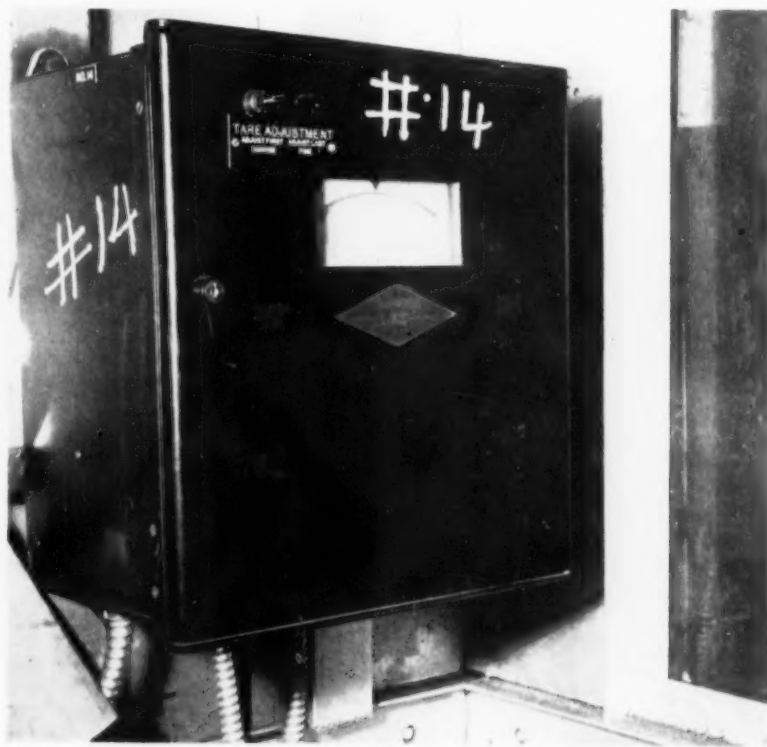
Profit In High Capacity—In establishing this SR-4 system, Sheffield used the simplest possible setup: four CXX compression-type cells and an instrument. To do this and still safeguard the cells against overload and impact damage, the four cells rate at 100,000 lb each—a total capacity of 400,000 lb—to weigh loads of about 50,000 lb.

The use of a cell capacity so much larger than the load being weighed eliminates the need for automatic controls and safety interlocks.

Weighing with the system is instantaneous, continuous and accurate. An initial weight reads with an accuracy of 0.25 pct. Repeated readings are accurate to 0.10 pct.



TROUBLE-FREE: Compact load cell unit is one of four supporting weighing platforms. The extra high capacity of each load cell forms a low cost overload protection for the weighing system.



CONTINUOUS READING: Signals from each of the four load cells feed into indicator to show weight of ladle contents. Operator controls the pour from this station, observing ladle through window at right.

Galvanizing: New Ways for an

By A. T. Baldwin—Galvanizing Consultant, and W. H. McMullen—Metallurgist,
Hanson-Van Winkle-Munning Co., Matawan, N. J.

The galvanizing industry today is in mid-stride between the past and the future.

Much of the work is still being handled manually by the same old methods that've been used for decades.

But changes are being wrought: continuous lines have been built and mechanization is slowly but surely gaining a foothold.

■ Since about 1932 there has been a continuing series of changes in techniques and equipment for hot galvanizing. Yet, much of the work being done today is by methods used almost since galvanizing began.

One of the places where change

has been more apparent is in the first step—cleaning.

Modern pickling procedures are usually based on sulfuric acid, from room temperature to 200° F and at 5 to 10 pct by volume of 66° Baume acid. The hotter acids create rougher surfaces and require careful rinsing to remove all pickle residues. Inhibitors help avoid over-pickling, and wetting agents provide better acid contact and improve drainage from the work.

Muriatic acid, from room temperature to 120° F, is used for light cleaning. Hydrofluoric acid at 5 to 10 pct by volume, cold, removes sand from castings; this is also being done with abrasives.

Thorough Rinse Needed—The next step after pickling is a thorough rinsing in cold water, followed immediately by coating with a protective film of flux. A

good rinse is vital—first, for complete removal of pickle dragout, and second, to prevent carryover of iron salts to the flux wash and molten zinc.

About 25 years ago muriatic acid as a flux wash was replaced with a less acid bath. Basically, the succeeding system calls for prompt and thorough rinsing in cold running water and immediate dipping in a heated solution of zinc ammonium chloride—the now universally recognized No. 20 Fluxes.

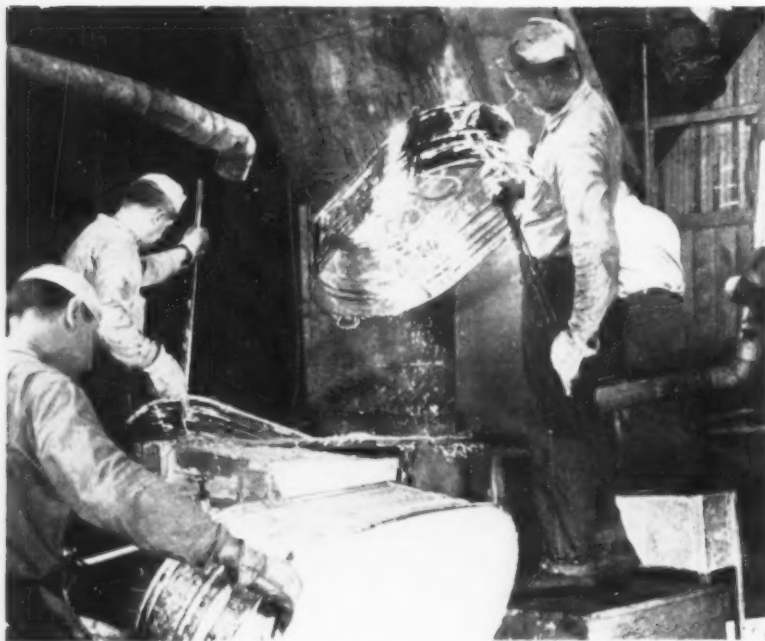
Flux washes vary in strength broadly between 1 and 3 lb of fluxing agent per gallon—enough to give an effective rust-retarding film, but not enough to delay its fusion and separation from the work surface when it's dipped in the molten zinc. The flux wash is heated to speed drying and prevent explosions during dipping.

Self-Cleaning Bath—Another possible source of iron contamination is the flux bath itself. In baths of average composition this attack would amount to 0.01 oz of iron dissolved from a square foot of mild steel surface exposed for one week.

Fortunately, modern flux washes hold only limited amounts of iron in solution—any excess soon appears as a brownish sludge which settles out readily. Purification is thus reduced to a simple decanting operation to keep iron content between 0.1 and 0.3 oz per gal.

This self-cleansing feature of the zinc ammonium chloride solution makes it unnecessary to use bath additions to keep iron dissolved. Wetting agents can be used to establish surface tension at 45 Dynes or less; this improves drainage and keeps sludge dragout at a minimum.

Watch Overheating—Pieces of work coming from the warm flux solution should be separated so the



OLD WAYS PREVAIL: Tubs and countless other preformed items are still galvanized entirely by hand to get smooth, drip-free edges.

Old Process

flux coating will dry evenly to a colorless film. Quick drying is important, but overheating may break the film.

If this happens, the work should be rinsed clean and re-dipped in the flux wash. Generally, drying can be done in chambers filled with air heated as high as 500°F and avoiding reoxidation of the work.

Zinc metal is, of course, the major raw material and the major item in cost. Prime Western Grade Zinc is the type commonly used.

Tin in amounts up to 2 pct is added to the molten zinc, largely to improve appearance of the spangle. Antimony in lesser amounts is added for the same purpose.

Permits Forming—Aluminum is the most widely used metallic additive. In amounts less than 0.05 pct of the bath it improves color and delays freezing of the coating to give better drainage from the work. At 0.10 to 0.20 pct Al the structure of the coating resembles that of a casting; it makes tight, ductile coatings which may be safely subjected to severe forming operations.

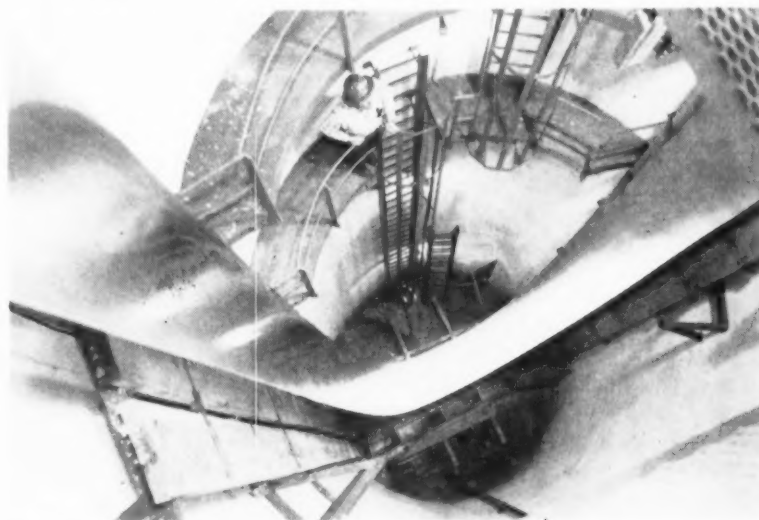
Spangled zinc coatings are popular. The spangles or flowers are zinc crystals formed by the combined affects of the base metal, its surface smoothness, the way the work is cooled and composition of the zinc coating. Exposure to air eventually dulls the spangles.

If the coated objects are quenched in water when they leave the molten zinc, the coating freezes so rapidly that crystals are too small to take on the usual spangled appearance. Yet, there's no detectable difference in protective value of the two types.

About Kettles—Kettles for the molten zinc are made of what is generally called firebox-type hot-rolled steel, containing less than 0.10 pct C and 0.07 pct Si. There



CORRUGATING ROLLS: Light-gage sheet is corrugated after galvanizing; heavier thicknesses for culverts are formed beforehand.



KEEPS IT ROLLING: Modern strip-galvanizing lines have looping pits on both sides of the zinc kettle to keep process continuous.

is no universally recognized specification for it.

Thickness of the kettle side-walls usually varies between 1 and 2 in., with 1½ in. a common choice. Today's kettles are designed to have all the required heat pass through the side walls only. This calls for greater kettle depth than in earlier days when heating through the bottom was the most popular method.

The most recent trend in kettle design is to have the side and end walls consist of two plates, each of

which is bent in a sort of U shape; the plates are then welded in a vertical seam at the middle of the ends. This cuts welded seams to two instead of one at each corner, and locates them at places where corrosion will be less severe. Weld seams are carefully stress-relieved and smoothed.

Kettle life is a constant concern to the hot galvanizer; burnouts are costly in lost production as well as in wasted zinc.

Hard To Mechanize—Mechanization has been a slow process in

hot galvanizing, due to the working temperature (830-870 F) of the molten metal, its weight, and the constant danger of burning the operators. A good bit of progress has been made, but much of today's production is still done on a piece-at-a-time or batch basis.

The jobbing shop in particular is seldom able to conveyorize many operations. Monorails and hoists can be used, but almost every move must be under manual control.

Domestic water heaters are an example of certain types of jobs which are now being conveyorized. Output by the manual process is about 35 to 45 units an hour; under some circumstances the output of a conveyorized line exceeds 200 an hour, due largely to putting the bottoms in after galvanizing.

Commercial pipe and electrical conduit have been partly conveyorized. Malleable iron pipe fittings, formerly handled manually on racks or in baskets, are also being turned out on mechanized lines.

Two Pot Men—Pipe is generally handled in "lifts" through the pickling, rinsing and fluxing steps. There are many detailed differences in the operation of feeding devices, but all of them require an operator to feed the pipe into position for the sinker to pack them down through a flux blanket into the molten zinc.

Next, the pipe pass under a suspended center separator, where they are lifted by a hook in the hands of the galvanizer. The two pot men are taught to keep the pipe moving so the pieces are removed in the same sequence that they entered under the sinker.

The galvanizer lifts the pipe and passes it through a ring to make contact with a magnetic pulley, which in turn makes withdrawal of the pipe automatic. The ring is connected to a compressed-air or steam source; this blows excess zinc from the outer surface of the emerging pipe. High-temperature steam (400° to 800 F) is blown down the center to remove excess zinc from the inner walls. The pipe then moves along a conveyor

to cool. In most cases, cooling is speeded by using a water spray or dip.

Drip, Wipe, Whirl—Removal of excess zinc is in many cases by simple drainage, controlled by temperature, fluidity of the zinc and removal rate. On products like wire, wire fabrics, pipe, sheet and strip, coating thickness is usually controlled by wiping devices.

A large class of products such as bolts, nuts and washers are handled in baskets in the zinc, which are then placed in specially built centrifugal machines.

Heavy structural pieces such as parts for derricks, towers, bridges and buildings call for careful handling and sturdy tools. Special jobs which are longer than the zinc kettles available are galvanized by dipping one end and then the other.

Form, Then Coat — Another large field of hot galvanizing is where sheetmetal wares such as tubs, buckets, sprinkling cans and trash cans are galvanized after forming. Here again the operation is entirely manual because of the wide variety of shapes and sizes and the need for smooth, drip-free edges.

The surface of the molten zinc

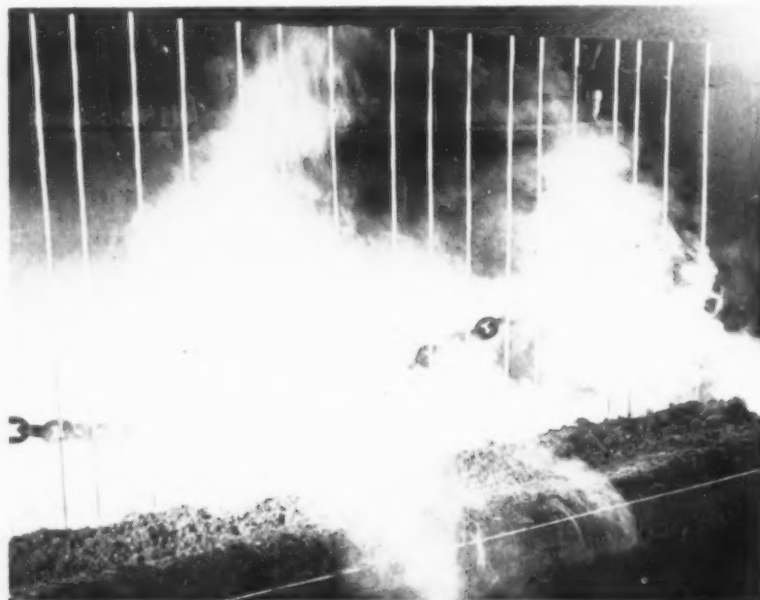
is divided by a dam, on one side of which is a hood covering a thick blanket of fused flux. Pickled, rinsed and cold-flux-coated work is placed on the flux fusion in the hood and gently forced down into the zinc and under the dam.

On the other side, it's carefully removed at a place where the molten zinc surface is kept free of oxide film. Work pieces are rotated until the spangles have formed, then piled in nests to be moved on to the next operation. A skilled crew can galvanize 300 water pails an hour.

Continuous Wire Line—Wire in strand form can be galvanized continuously, right from the annealing operation through pickling, fluxing, zinc coating, wiping and coiling. Up to 40 strands may be treated at one time.

First, the coils are placed on uncoiling spindles. From here the strands go through a heat-treat furnace to the pickling, rinsing and fluxing stations. Next, the wires enter the zinc kettle and finally pass out through asbestos "tight" wipes to the takeup blocks.

Asbestos wiping gives thin coatings and permits higher operating speed. For thicker coatings, the wires emerge vertically from the



CONTINUOUS LINE: Multiple strands of wire pass from molten zinc through charcoal bed which delays freezing to make thicker coat.

zinc through a bed of moistened charcoal and rise several feet in the air before passing over a wheel to the takeup blocks. The charcoal bed delays freezing, so excess zinc flows back into the pot.

Subsequent Draw—Quite often in this country, galvanized wire is later drawn in stages to much finer sizes. This demands very ductile and adherent coatings. These are obtained by extreme cleansing care, short immersion times and low kettle temperatures.

One method of reducing immersion time is to preheat the wire; this cuts immersion to less than one second.

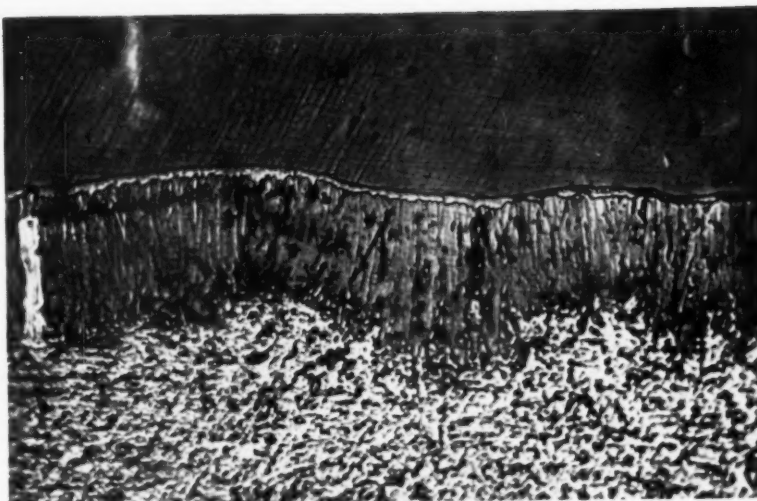
Sheet galvanizing, the largest user of zinc in the hot-coating field, has moved farthest toward complete mechanization. But while much of it is now galvanized continuously in strip form and then cut to the desired size, a good bit is still processed as precut sheets.

Sheets are prepared by pickling in hot sulfuric acid and rinsing in water which might contain an alkali to fully neutralize dragover acid. Then they're stored underwater until it's time for coating. Just before coating the sheets pass through a cold, dilute (1-2 pct) muriatic acid bath, then go directly to the zinc kettle.

The Big Guns—Continuous cold-rolled strip can be galvanized in either of two ways: one, called the Sendzimer Process after its inventor, is also known as the "annealing-inline" method; the other, a more recent innovation, is the "annealing-out-of-line" Cook-Norteman process developed by Wheeling Steel Corp.

In the Sendzimer Process, strip leaving the rolling operation is run through an oxidizing furnace which acts as a cleaning stage. Next, it goes through a furnace which reduces iron oxides on the surface and heat-treats the strip to the desired physical properties.

The chain of furnaces ends in a cooling section, from which the prepared strip is delivered to the kettle at 900° to 950°F through a



TYPICAL STRUCTURE: Micrograph taken at 1000x shows four phases in a typical hot-dipped zinc coating. Next to the smooth steel base is the narrow white band called gamma, said to be $\text{Fe}_7\text{Zn}_{10}$ (21-28 pct Fe). Adjoining palisade layer, called delta, is FeZn_7 (7-11 pct Fe); it diffuses into the broad darker band called the zeta layer, FeZn_{13} (6.25 pct Fe). Wide layer at top is the eta, or pure zinc, and can have only 0.003 pct Fe. The galvanizer's aim is to keep gamma, delta and zeta layers as thin as possible and create a denser zinc coating on top.

chute that sends it below the surface of the molten zinc. Heat from the strip keeps the zinc molten. Finally, the coated strip rises vertically until the spangles have formed.

Allows "High" Aluminum—Since the strip doesn't pass through a flux blanket or have a film of flux, aluminum contents of 0.1 to 0.2 can be used in the bath. This creates a denser, more homogeneous zinc coating, reduces dross, and gives superior forming qualities.

The Sendzimer Process and variations on this basic annealing-inline method are responsible for the larger portion of the galvanized steel tonnage reaching the market today.

The newer Cook-Norteman Process is also based on using 0.10 to 0.20 Al in the zinc bath. It doesn't, however require the extensive line of furnaces needed for the Sendzimer method; coils are box-annealed in regular units which may already be part of the steel mill.

But Kettle Is Heated—The strip of annealed stock is passed through

a series of tanks where it's hot-water washed, pickled lightly, alkali-cleaned, rinsed and flux-coated. It then moves vertically through a dryer which sets the thin, uniform flux film and heats to temperatures approaching 500°F. To maintain continuous strip movement, looping pits are provided on both sides of the kettle.

External heat in the form of Ajax low-frequency induction units keep the zinc molten; they also maintain uniform distribution of the aluminum to form highly ductile, adherent coatings. This method allows use of a container or kettle made of brick instead of steel.

Finally, the strip rises vertically into a cooling chute. After cooling enough for the spangle to set it returns down an inclined chute to the hot-water scrubber, stretcher, leveler, shear and piler.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Better Corrosion Resistance Stems From New Plating Line

The protective finish on a product is a gage of quality, especially when it serves under corrosive conditions.

But it's all the more important with a polished surface that's expected to last through years of service.

■ For valves that must withstand corrosion and yet retain good appearance, it takes a careful choice of plating process to get an economical finish. Sloan Valve Co. in modernizing its Chicago plant chose a new, direct bright-nickel plating process to do the job on its flush valves.

Tests of standard plating solutions made in cooperation with engineers and chemists of the Hanson-Van Winkle-Munning Co., Matawan, N. J., resulted in the selection of H-VW-M's Nickel-Lume process. The new plating shows low internal stress and good ductility to withstand hard handling during installation.

Production Tool—The Nickel-Lume bath in conjunction with the new H-VW-M automatic plating machine speeds production and produces uniform results. Newly designed racks hung on the carrier arms carry the flush valve parts.

The carriers automatically convey the parts through cleaning baths, the Nickel-Lume solution, a rinse, the chrome bath, a rinse, and then through a drying oven.

The automatic machine is controlled from a point beside the machine, where the operator can watch the entire plating cycle. It results in lower labor costs compared to previous manual methods.

Uniform Product—The cycle gets close control over immersion time,

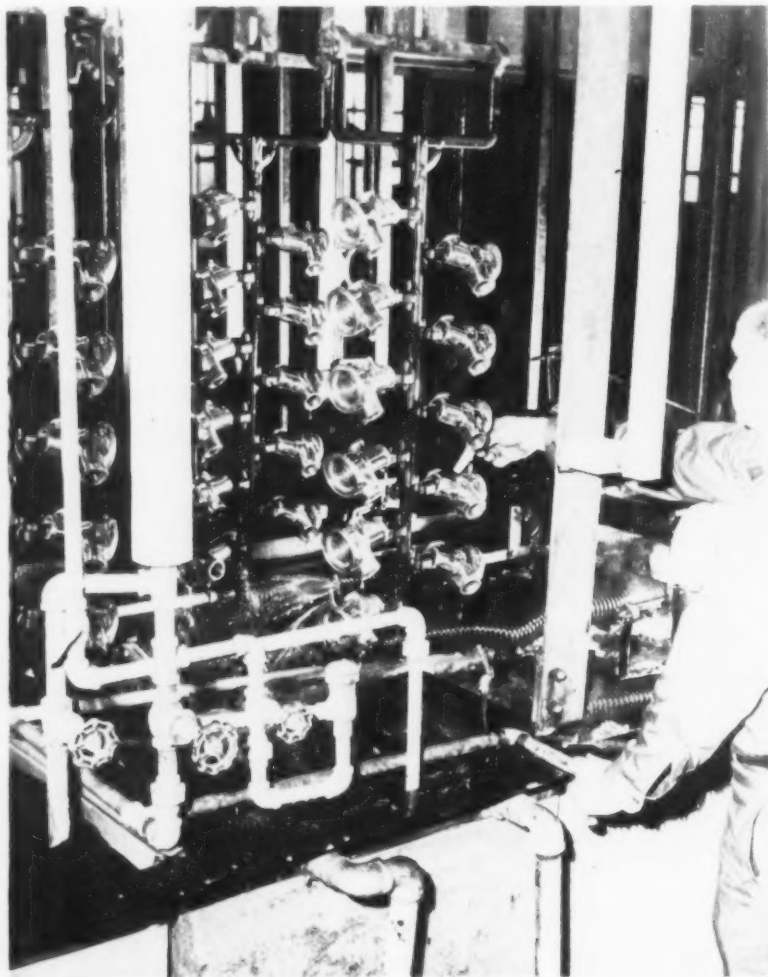
The Nickel-Lume virtually eliminates plating rejects and the resultant stripping and replating costs. By increasing the production rate, Sloan has evened out peak-period "pile-ups" at the plating room.

With a high tolerance to impurities, the new process reduces the purification needed. Ordinary methods can control both organic or inorganic contamination.

Because chromium is deposited

over the nickel, a highly active surface is important. The Nickel-Lume does not require activating treatment before the parts are given the final chromium plate.

Current densities in the tanks can vary from 5 to 7 asf, without burning the deposit, to coincide with the workload. Operating temperatures range from room temperature up to or beyond 140°F with full deposit brightness and leveling.



QUALITY CONTROL: While cycle timing is automatic, inspector maintains constant check on cleaning, rinsing, and plating solutions.

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Production *and* product bonuses are all yours with Weirzin electrolytically zinc-coated steel, as many a manufacturer is finding out.

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"In the matter of die life, we have substantially increased our production of shells between grinds, thanks to the lubricating action of Weirzin's zinc coating."

Weirzin's zinc coating stands up under the most punishing fabrication steps, too. Won't chip, flake, peel; ends costly re-coating of steel parts after fabrication. And *chemically treated* Weirzin takes paints, enamels, lacquers and lithograph inks beautifully; holds them better than any other form of steel; eliminates underfilm corrosion. Investigate Weirzin's superior steel fabricating qualities and flawless rust prevention.

Write Weirton Steel Company, Dept. A-12, Weirton, West Virginia, for free illustrated booklet—"Weirzin."



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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 161.

Precision Tools

A 184-page catalog describes and illustrates small tools and precision equipment designed for work on small instrument parts and allied uses. (For free copy, write on company letterhead to C. & E. Marshall Co., Box 7737, Chicago 80, Ill.)

Tracer Lathe

Tracer lathes are depicted in a bulletin. (Cincinnati Lathe & Tool Co.)

For free copy circle No. 1 on postcard, p. 161

Air Gage

An illustrated folder reports on a new comparator gage that works on the back-pressure circuit principle. The gage consists of a filter, pressure regulator, pressure gage, adjustable restriction unit and a gaging indicator. (Freedland Gauge Co.)

For free copy circle No. 2 on postcard, p. 161

Deburring Units

To meet requirements of aircraft and missile makers, a company has introduced a new deburring and surface finishing unit. It's an extra heavy-duty powered machine using a combination mechanical and hydraulic power drive. This is precisely timed and coordinated by

electronic controls. The unit comes in sections. Each of these is capable of finishing from one to six 8 1/2-ft long parts. (Speed-D-Burr Corp.)

For free copy circle No. 3 on postcard, p. 161

Steel Shelving

Fast assembly steel shelving is described in a bulletin. This shelving features a built-in self-locking device for rapid erection and subsequent disassembly. (Standard Pressed Steel Co.)

For free copy circle No. 4 on postcard, p. 161

Testing

Testing of aircraft electric systems is discussed in a bulletin. It describes a new laboratory to help speed development of complete electric systems. (General Electric Co.)

For free copy circle No. 5 on postcard, p. 161

Wire Rope

Wire rope slings are dealt with in a handbook. It also covers fittings. (Union Wire Rope Corp.)

For free copy circle No. 6 on postcard, p. 161

Photo-forming Parts

Photo-forming of metal parts is discussed in a bulletin. It analyzes two processes: chemical etching and electrolytic etching. (Superior Tube Co.)

For free copy circle No. 7 on postcard, p. 161

Grinding Wheels

Grinding wheels and a "positive duplication" manufacturing process are discussed in a 36-page brochure. It includes facts on wheel markings and their meanings, grinding wheel types and uses,

characteristics of incorrect wheel gradings, and grinding faults. Other sections show wheel mounting methods, dressing methods, how to inspect, handle, and store wheels, and many good safety practices to follow. (Cincinnati Milling Products Div.)

For free copy circle No. 8 on postcard, p. 161

Freight Bracing

Five basic methods of securing rail shipments with steel strapping are obtained in a folder. It tells how these methods help prevent damage and facilitate fast, safe, easy unloading. (Signode Steel Strapping Co.)

For free copy circle No. 9 on postcard, p. 161

Forging, Stamping

How a commercial supplier of forgings and deep-drawn stampings integrates modern facilities with customers' needs for new parts, new techniques, new materials is described in a 20-page booklet. (Transue & Williams Steel Forging Corp.)

For free copy circle No. 10 on postcard, p. 161

Temperature Control

Equipment for firing temperature measurement and control for rotary kilns is analyzed in a 4-page data sheet. (Leeds & Northrup Co.)

For free copy circle No. 11 on postcard, p. 161

Titanium

A titanium producer's new buyers' guide lists a recent 10 pct reduction in mill products prices. The new edition also includes information on titanium alloy Ti-5Al-2.5Sn (5 pct aluminum, 2½ pct tin). (Titanium Metals Corp. of America).

For free copy circle No. 12 on postcard, p. 161

Chlorothene

Properties and uses of chlorothene (inhibited 1,1,1-trichloroethane) are presented in a booklet. The 16-page publication contains information on the versatile cold-cleaning solvent. (Dow Chemical Co.)

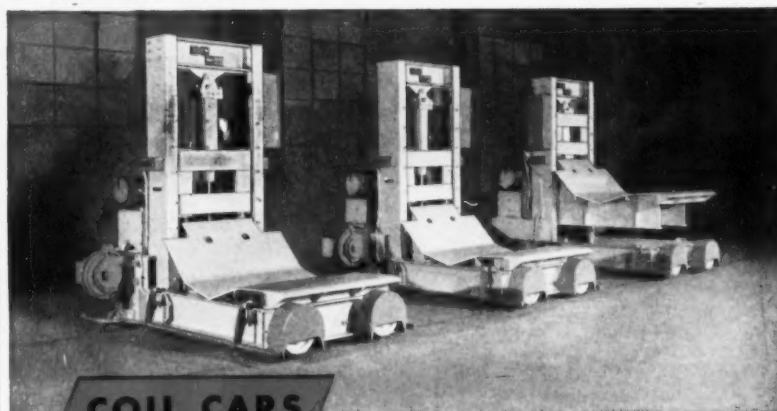
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Noise Deadener

If you have a problem of metal-produced noise — tinniness, drum-

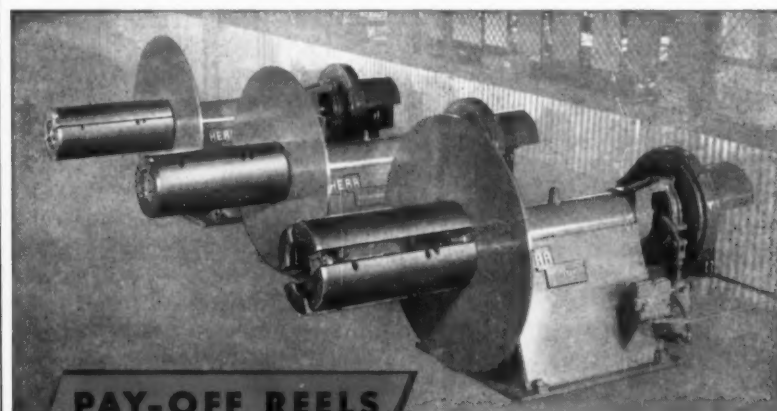


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FREE LITERATURE

ming, or clang or bang, you may be interested in a new product. It's a non-flammable, non-toxic, non-explosive, odorless and stable deadening material for use on steel surfaces. A chart in a 6-page booklet shows results of 17 tests on the deadener. (Philip Carey Mfg. Co.)

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Plastics Molder

A new bulletin describes a 6/8-oz capacity plastics injection molding machine. (The Hydraulic Press Mfg. Co.)

For free copy circle No. 15 on postcard, p. 161

Electric Substations

Advantages of package unit substations are explained in a brochure. Both high voltage and low voltage components are covered. (Square D Co.)

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Electroplating

Electroplating, anodizing and other treatments of aluminum can be performed on new automatic rack processing machines. A bulletin describes these units. (Frederic B. Stevens, Inc.)

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Batteries

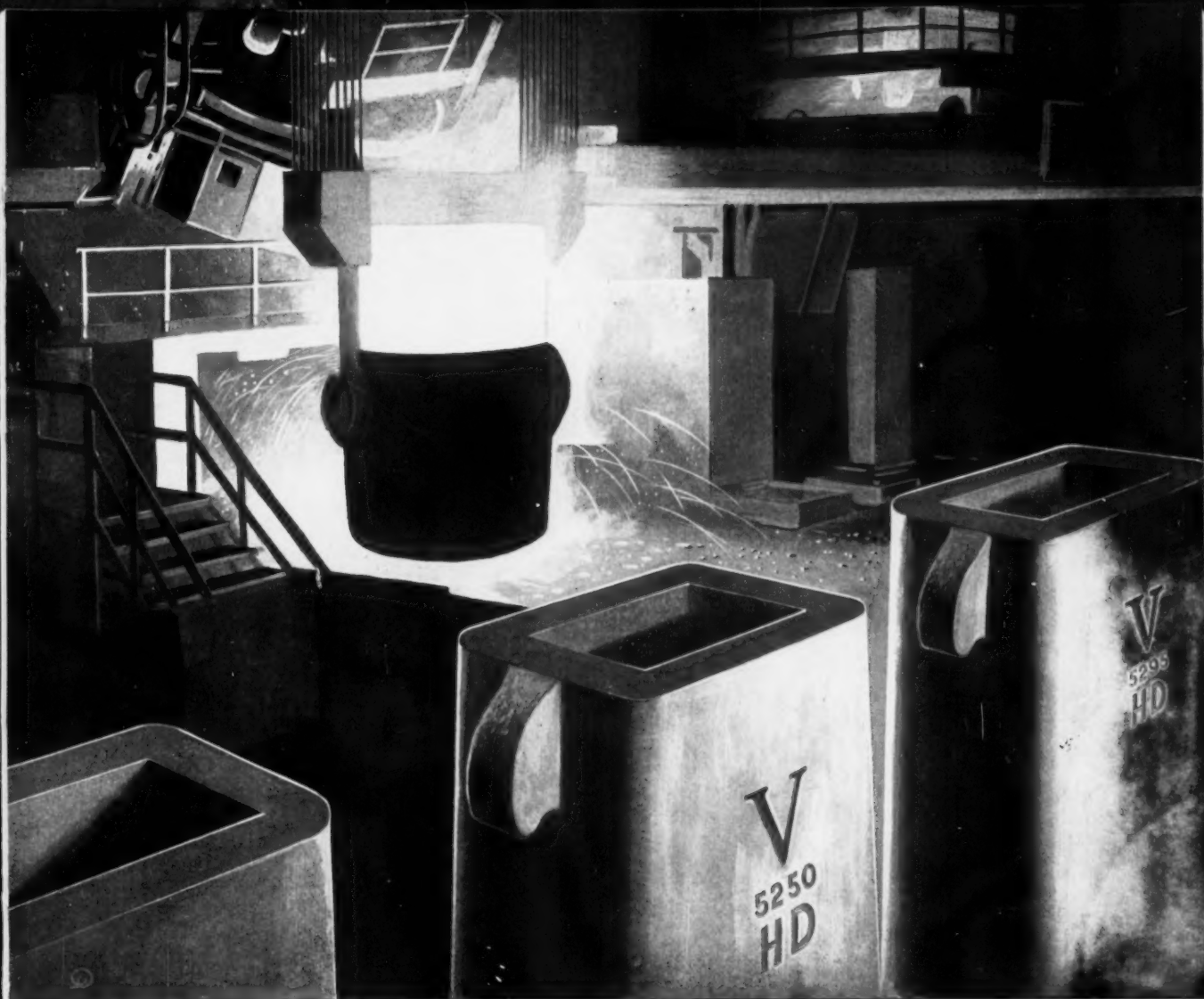
Lead-acid motive power batteries need maintenance. A new manual explains why and tells how to keep up batteries. It also looks into theory and construction in textbook style. (Gould - National Batteries, Inc.)

For free copy circle No. 18 on postcard, p. 161

Speed Reducers

A 40-page catalog covers spiral-bevel gear reducers. It reviews design features, gives selection dimensions, horsepower ratings, parts lists, etc. (Philadelphia Gear Works, Inc.)

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FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Heat Treat Pots

A new six-page folder gives data on specifications and performance of salt heat treat pots. (Electro-Alloys Div., American Brake Shoe Co.)

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Industrial Installation

A company in the field of industrial installation has published a 16-page booklet including sections on press erecting, rolling mill installations, machinery installations, foundry and overhead crane installations and mothballing. (Commercial Contracting Corp.)

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Wire Coil Handling

The announcement of a new automatic handling system for rod and wire coils comes in the form of an illustrated brochure. It describes the system where one man can quickly prepare coils for annealing and handle coils after annealing. (Lee Wilson Engineering Co., Inc.)

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Circuit Breakers

A new four-page bulletin describes the industrial line of molded-case circuit breakers in ratings of 15 to 800 amp. The publication gives enclosure information, ratings, modifications and accessories. (General Electric Co.)

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High-Temperature Alloy

The latest information on the properties of a high temperature alloy for aircraft and metalworking

applications is contained in a 24-page booklet. The alloy is recommended for use at high stresses up to 1500°F, and at moderate stresses up to 2000°F. (Haynes Stellite Co., Div. Union Carbide Corp.)

For free copy circle No. 24 on postcard

Stainless Fasteners

A guide to stainless steel fasteners illustrates 37 different types of standard fasteners. (Allmetal Screw Products Co., Inc.)

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Cap Screws

Cut-away drawings in a folder show how cap screws are made self-locking and vibration proof by a patented nylon pellet. (Recommended installations are also illustrated. (The Cleveland Cap Screw Co.)

For free copy circle No. 26 on postcard

Milling Machine

Three-dimensional tracer milling is described in new folder illustrating operation features of filling machine. (Sundstrand Machine Tool Co.)

For free copy circle No. 27 on postcard

Stamping Machines

Specifications for four sizes of automatic stamping machines are listed in new illustrated booklet. It includes information on auxiliary attachments and examples of typical applications in production of precision formed stampings. (U. S. Tool Co., Inc.)

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Metal Marking Crayon

Folder describes advantages of marking crayon for castings, hot ingots, plates and slabs. (Wm. Korn, Inc.)

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Carbide Tools

A new 56-page catalog covers carbide tips, tools and inserts. A picture index easily identifies each product. A complete grade selec-

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FREE LITERATURE

tion chart is included. (Firth Sterling, Inc.)

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Knuckle Joint Presses

Presses in the range of 150 to 1000 ton capacities are described in new eight-page booklet. Embossing, sizing and coining are the primary fields of application. (The Minster Machine Co.)

For free copy circle No. 31 on postcard

Hydraulic Pumps

Pumps for continuous service at 2000 psi are illustrated in booklet describing performance and applications. (Denison Engineering Div., American Brake Shoe Co.)

For free copy circle No. 32 on postcard

Foundry Patterns

Extensive facilities for pattern making in both wood and metal are described and illustrated in new folder. (Linden Pattern Corp.)

For free copy circle No. 33 on postcard

Tool Steel

Two grades of ground flat stock, namely oil hardening and air hardening tool steels, are covered in new eight-page catalog. (Firth Sterling, Inc.)

For free copy circle No. 34 on postcard

Seamless Tubing

In designing equipment involving the use of hollow cylindrical parts, the engineer will benefit from an eight-page folder explaining the cost and time-saving features of tubing over other forms of stock. Included are descriptions of how the seamless mechanical tubing is manufactured and finished. (The Tubular Products Div., The Babcock & Wilcox Co.)

For free copy circle No. 35 on postcard

Stud Welding

Information needed to get good results, at low cost, in detailing and

specifying one maker's standard end-welding studs is included in a new 38-page manual. Covered are dimensions of the standard studs and ferrules, size of weld fillets, available types of plating, annealing and flux, and analyses and mechanical properties of stud materials. (Nelson Stud Welding Div., Gregory Industries, Inc.)

For free copy circle No. 36 on postcard

Zirconia Ware

Properties and characteristics of stabilized zirconia ware (ZrO_2) are explained in a booklet. It lists various zirconia straight-sided crucibles, tubing and combustion boats. (Laboratory Equipment Corp.)

For free copy circle No. 37 on postcard

Milling Cutters

Forty-nine types of solid high-speed steel milling cutters are listed in a 32-page catalog. These cutters are designed for machining aluminum, light metal alloys and ferrous materials. (Goddard & Goddard Co.)

For free copy circle No. 38 on postcard

Assembly Machines


Special automatic assembly machines are outlined in a brochure. So, too, are suggestions for taking the best advantage of automatic assembly operation. It points out that such operations can often be combined on the same machine with automatic selection, orientation, machining and inspection, saving time, manpower and floor space. (Omer E. Robbins Co.)

For free copy circle No. 39 on postcard

Phosphor Bronze

A technical bulletin describes advantages of a fine-grain phosphor bronze. The 4-page publication shows microscopic photographs demonstrating the difference between the material and commercially-available phosphor bronze. (Riverside-Alloy Metal Div., H. K. Porter Co., Inc.)

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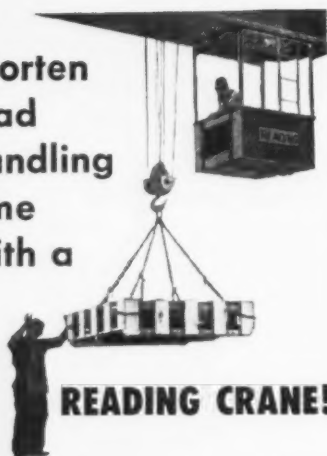
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AISE MEETING

Iron, Steel Engineers In Annual Meeting

Marking its 50th anniversary, the Assn. of Iron & Steel Engineers will gather at Pittsburgh this month.

Slated for discussion are many items on metalworking engineering. Sessions cover: electricity, combustion, operating practices, lubrication, rolling mills, and oxygen.

■ Many phases of metalworking engineering are slated for discussion at the Assn. of Iron & Steel Engineers 1957 annual convention. Held at Pittsburgh, the Hotel Penn-Sheraton will be the group's headquarters for all sessions. These will begin with registration on Monday morning, Sept. 29; they'll run through Sept. 26.

Marking the 100th year of steel-making in this country and its own 50th Anniversary, the association will find ample time to discuss past practices and history. However, in the main, technical sessions deal with maintenance, development, operations and progress. On the schedule are papers and discussions on electricity, combustion, operating practice, lubrication, rolling mills, and oxygen.

PROGRAM

Monday, September 23

9:00 AM—REGISTRATION—

FORT DUQUESNE ROOM

9:15 AM—BUSINESS MEETING

URBAN ROOM

Conducted by President J. D. O'Roark.

9:30 AM—ELECTRICAL SESSION

URBAN ROOM

Chairmen: John F. Kostelac, Assistant Electrical Superintendent, Crucible Steel Company of America, Midland, Pa. E. L. Anderson, Superintendent Electrical Dept., Bethlehem Steel Co., Johnstown, Pa.

"Standardized Component Parts for Heavy Duty Mill Type Cranes," by Myron R. Bowerman, Director of Research, and Elvin R. Madison, Research Engineer, The Alliance Machine Co., Alliance, Ohio.

"Increasing Open Hearth Capacity by Use of Light Weight Ladle Trolleys," by F. C. Schoen, Chief Engineer, Alan Wood Steel Co., Conshohocken, Pa.

"An Automatic Gage Control System for Tandem Cold Mills," by N. S. Walker, General Maintenance Foreman, Tin Mill Cold Reduction Dept., Gary Sheet and Tin Mills, United States Steel Corp., Gary, Ind., J. W. Cook, Steel Mill Engineers, Industry Engineering Dept., Westinghouse Electric Corp., East Pittsburgh, Pa., and J. W. Wallace, Mill Systems Development Engineer, Control Engineering Dept., Westinghouse Electric Corp., Buffalo, N. Y.

9:30 AM—COMBUSTION SESSION—

MONONGAHELA ROOM

Chairmen: F. B. Bevelheimer, Power and Fuel Engineer, Engineering Dept., Jones & Laughlin Steel Corp., Pittsburgh, Pa. F. C. McGough, Superintendent, Main-

tenance and construction, Detroit Steel Corp., Portsmouth, Ohio.

"Open Hearth Fuel Atomization with Reaction Type Jet Burners," by G. W. Hinds, Development Engineer (Metallurgy), and A. L. Hodge, Staff Engineer (Metallurgy), Development Laboratory, Linde Co., Div. of Union Carbide Corp., Newark, N. J.

"Accelerated Firing Rates in Open Hearth Furnaces," by E. T. W. Bailey, Chief Combustion Engineer, The Steel Company of Canada, Ltd., Hamilton, Ontario, Canada.

2:00 PM—MECHANICAL SESSION—

MONONGAHELA ROOM

Chairmen: R. A. Kraus, Assistant Superintendent of Maintenance, Republic Steel Corp., Chicago, Ill. E. F. Donatic, General Superintendent, Kaiser Steel Corp., Fontana, Calif.

"Magnetic-Flux Gas-Shielded Arc Welding," by J. E. Dato, Manager Eastern Region — Electric Welding, Linde Co., Div. of Union Carbide Corp., New York, N. Y.

"Railroad Car Rebuilds and Repair at Kaiser's Fontana Works," by A. B. Stoker, Foreman, Car Repair Shop, Kaiser Steel Corp., Fontana, Calif.

"Planned Maintenance Techniques for A Hot Strip Mill," by James R. Kennedy, Maintenance Foreman, Hot Mill Mechanical Dept., Pittsburgh Works Div., Jones & Laughlin Steel Corp., Pittsburgh, Pa.

2:00 PM—OPERATING PRACTICE SESSION—

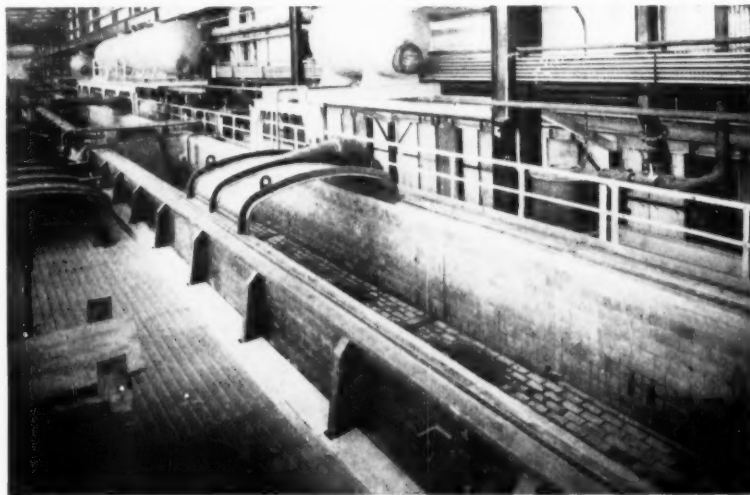
URBAN ROOM

Chairmen: G. I. Bottcher, Chief Engineer, Allegheny Ludlum Steel Corp., Brackenridge, Pa. S. O. Evans, Manager, Tubing Operations, Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

"The Replacement of Steel Mill Plant and Equipment with Present Depreciation Reserves," by William T. Hogan, S. J., Professor of Eco-

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nomics and Director, Economics Program, Fordham University, New York, N. Y.

"Design of a large Tonnage Continuous Casting Plant," by Rufus Easton, Manager Continuous Casting Section, Freyn Dept., Koppers Co., Inc., Pittsburgh, Pa., and Harold E. Skelley, Power and Fuel Engineer, Engineering Dept., In-

land Steel Co., Indiana Harbor Works, East Chicago, Ind.

"The Dollars and Sense of Pickle Liqueur Treatment," by James S. Joseph, Sales Engineer, and Elbert T. Culver, Senior Process Engineer, Chemical Dept., Engineering and Construction Div., Koppers Co., Pittsburgh, Pa.

Tuesday, September 24

Chairmen: D. C. McCrady, Superintendent, Electrical Dept., Steel Company of Canada, Ltd., Hamilton, Ontario, Canada; J. A. Drgon, Division Superintendent, Maintenance and Utilities, Edgar Thomson Works, United States Steel Corp., Braddock, Pa.

"Electrical Advances Can Reduce Installed Cost," by E. E. Vonnada, Product and Application Specialist, Reliance Electric and Engineering Co., Cleveland, Ohio.

"Protection Against Prolonged Delays on Main Drive Electrical Equipment," by H. H. Angel, Electrical Engineer, Construction Engineering Dept., Bethlehem Steel Co., Bethlehem, Pa.

"Selection of Electric Equipment for Temper and Skin-Pass Mills," by J. E. Peebles, J. J. Remley, and R. B. Eggleston, Steel Mill Engineers, Systems Application Engineering Section, General Electric Co., Schenectady, N. Y.


Chairmen: R. A. Lambert, Superintendent, Steam Efficiency and Combustion Dept., Pittsburgh Works Div., Jones & Laughlin Steel Corp., Pittsburgh, Pa.; W. M. Bloom, Fuel Engineer, Allegheny Ludlum Steel Corp., Brackenridge, Pa.

"High Velocity Gas Stress Relieving Furnace," by Edward M. Yard, Chief Project Engineer, Mechanical, John A. Roebling's Sons Corp., Trenton, N. J.

"Fast Annealing of Sheet-Strip Coils with Helium Injection," by J. D. Keller, Partner, Associated Engineers, Pittsburgh, Pa.

"Continuous Annealing 60 Tons per Hour of Tinplate," by J. Neil Laidman, Engineer, Physical Metallurgy Section, Research Dept., Bethlehem Steel Co., Sparrows Point, Md., and Quentin M. Bloom, Manager, Furnace and Kiln Div.,

NEW!

Now equipped with a new and larger Onan 12.9 hp engine, the new Miller AEA-200-L produces a full 225 amperes of continuous rated, high cycle welding current or, 5 KW of 110/220 ac power for operation of power tools, lights, milking machines, etc., or, 1 KW of dc power.

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2:00 PM—OPERATING PRACTICE SESSION—

URBAN ROOM

Chairmen: W. O. Bishop, Superintendent Blast Furnaces, Inland Steel Co., East Chicago, Ind.; John M. Walsh, Assistant General Superintendent, Gary Steel Works, United States Steel Corp., Gary, Ind.

"Modern Methods of Iron Ore Reduction," by H. W. McQuaid, Consulting Metallurgical Engineer, Cleveland, Ohio.

"Techniques in Rebuilding a Blast Furnace," by C. F. Bessent, Supervisor, Mechanical Maintenance Dept., Bethlehem Steel Co., Sparrows Point, Md.

"Distributing Raw Materials in Blast Furnaces," by Henry W. Campbell, Chief Engineer, Interlake Iron Corp., Cleveland, Ohio.

2:00 PM—LUBRICATION SESSION

MONONGAHELA ROOM

Chairmen: C. A. Bailey, Lubrication Engineer, National Tube Div., United States Steel Corp., Pittsburgh, Pa.; C. T. Lewis, Chief Lubrication Engineer, Republic Steel Corp., Cleveland, Ohio.

"The Importance of Pumpability and Heat Stability in Industrial Greases," by Wm. A. Magie, 2nd, Vice President, Magie Bros. Oil Co., Franklin Park, Ill.

"Important Consideration in the Design of Modern Centralized Lubricating Systems," by G. C. Almasi, Materials and Standards Engineering Div., Crucible Steel Company of America, Midland, Pa.

"Development and Application of Spray Lubrication," by E. J. Gesdorf, Senior Application Engineer, The Farval Corp., Cleveland, Ohio.

Wednesday, Sept. 25

9:00 AM—ROLLING MILL SESSION—

URBAN ROOM

Chairmen: A. M. Cameron, Su-

perintendent, Blooming and Bar Mills, Atlas Steels, Ltd., Welland, Ontario, Canada; R. C. Schaefer, Superintendent Hot Strip Mill, Wheeling Steel Corp., Steubenville, Ohio.

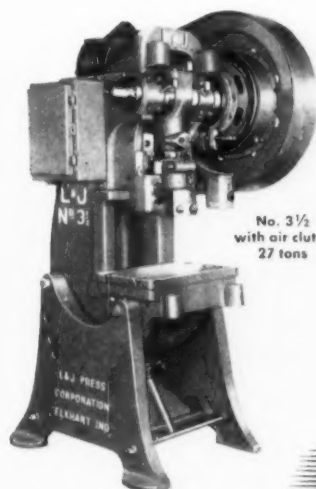
"Automatic Contour Turning of Large Mill Rolls," by William Hyams, Manager of Machinery Sales, Mackintosh - Hemphill Div., E. W. Bliss Co., Pittsburgh, Pa.

"Some Practical Solutions to Hot Mill Problems," by R. A. Smith,

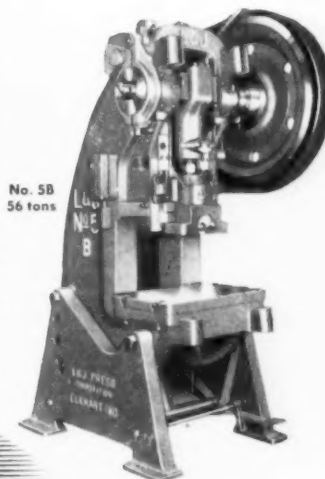
Assistant General Foreman, and A. D. Patton, Assistant to General Foreman, 96-in. Hot Mill, Pittsburgh Works Div., Jones & Laughlin Steel Corp., Pittsburgh, Pa.

"Application of Stretch Reducing of Tubes—For Greater Production and Economy," by William Rodder, First Vice President, The Aetna - Standard Engineering Co., Pittsburgh, Pa.

9:00 AM—LUBRICATION SESSION—

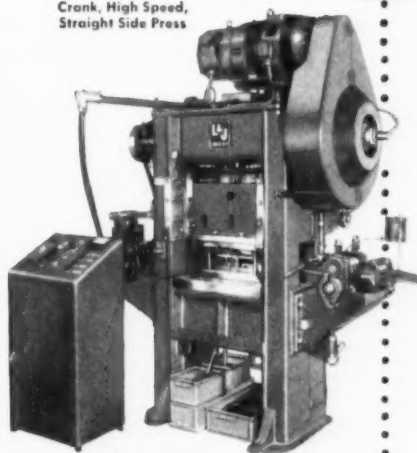


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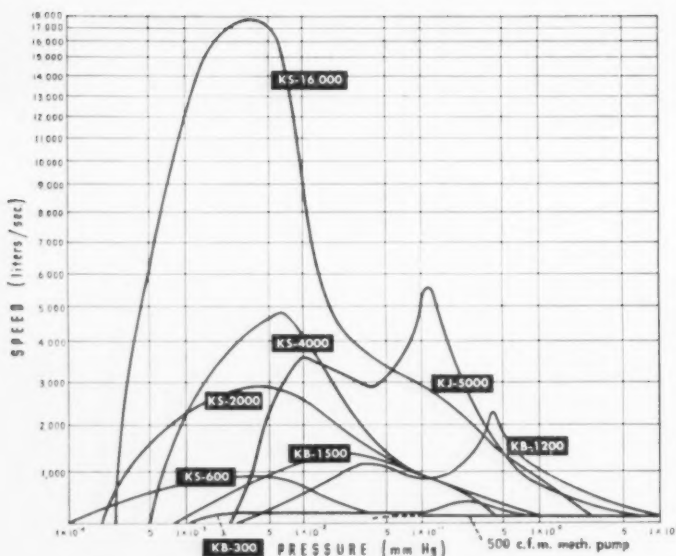
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KS-2000	Up to 300 lb. Melting and Casting @ 1 to 10 μ pressure
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AISE MEETING

MONONGAHELA ROOM

Chairmen: A. E. Cichelli, Lubrication Engineer, Construction Engineering Dept., Bethlehem Steel Co., Bethlehem, Pa.; D. E. Whitehead, Materials and Standards Engineer, Crucible Steel Company of America, Pittsburgh, Pa.

"Large Motor Bearings," by Walter T. Saveland, Jr., Supervisory Engineer, Renewal Parts and Service, Motor and Generator Dept., Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

"Maintenance of Oil Film Bearings on European Mills," by Samuel Carson, Field Engineer, Morgan Construction Co., Worcester, Mass.

"Ten Painting 'Reminders' for Steel Plants," by Walter T. Yarhouse, Industrial Sales Representative, The Sherwin-Williams Co., Cleveland, Ohio.

2:00 PM—OPERATING PRACTICE SESSION—

URBAN ROOM

Chairmen: R. W. Holman, Director of Control Mechanisms Research, Research and Technology Div., United States Steel Corp., Pittsburgh, Pa.; Emil Kern, Vice President in Charge of Engineering, Allegheny Ludlum Steel Corp., Brackenridge, Pa.

"Steel Industry in Mexico—Its Present and Immediate Future," by Pascual Gutierrez Roldan, Managing Director, Altos Hornos de Mexico, S. A., Mexico, D. F.

"The Steel Industry in India—Yesterday, Today and Tomorrow," by E. T. Warren, President, Tata, Inc., New York, N. Y.

"European Steelmaking Today—The Technical and Economic Picture," by Alastair McLeod, Editorial Director-Technical, Industrial Newspapers, Ltd., Adelphi, London, England.

2:00 PM—ELECTRICAL SESSION—

MONONGAHELA ROOM

Chairmen: R. G. Nolan, Electrical Engineer, Granite City Steel Co., Granite City, Ill.; R. T. Winterringer, Assistant Superintendent, Electrical Dept., Republic Steel Corp., Chicago, Ill.

"Light Flicker Caused by Electric Steel Furnaces," by W. E. Schwabe, Product and Process Development Laboratories, National Carbon Co., Div. of Union Carbide Corp., Niagara Falls, N. Y.

"Trends in Ingot Buggy Design," by H. G. Frostick, General Supervisor Design Engineering (New Mills Construction), South Works, United States Steel Corp., Chicago, Ill.

"Blast Furnace Automatic Charging Control System," by S. P. Curtis, Chief Engineer, Fairless Works, United States Steel Corp., Fairless Hills, Pa.; R. F. Schramm, Chief Electrical Engineer, Arthur G. McKee & Co., Cleveland, Ohio, and D. W. Fath, Senior Engineer, Cutler-Hammer, Inc., Milwaukee, Wis.

**7:00 PM—FORMAL DINNER—
BALL ROOM**

Speaker: George Jason.

**10:00 PM—DANCE—
URBAN ROOM**

AISE members and guests. No admission charge.

Thursday, September 26

**9:00 AM—COMBUSTION
SESSION—**

URBAN ROOM

Chairmen: G. H. Krapf, Division Superintendent, Power Production, South Works, United States Steel Corp., Chicago, Ill.; F. R. Pullen, Fuel Engineer, Bethlehem Steel Co., Johnstown, Pa.

"Trends in Steel Mill Power Plants," by Howard G. Kitt, Senior Power Engineer, and Robert W. Worley, Chief Power Engineer, United Engineers & Constructors, Inc., Philadelphia, Pa.

"Gas Storage for Peak Demands," by Robert Kyle, Vice President, The Gas Machinery Co., Cleveland, Ohio.



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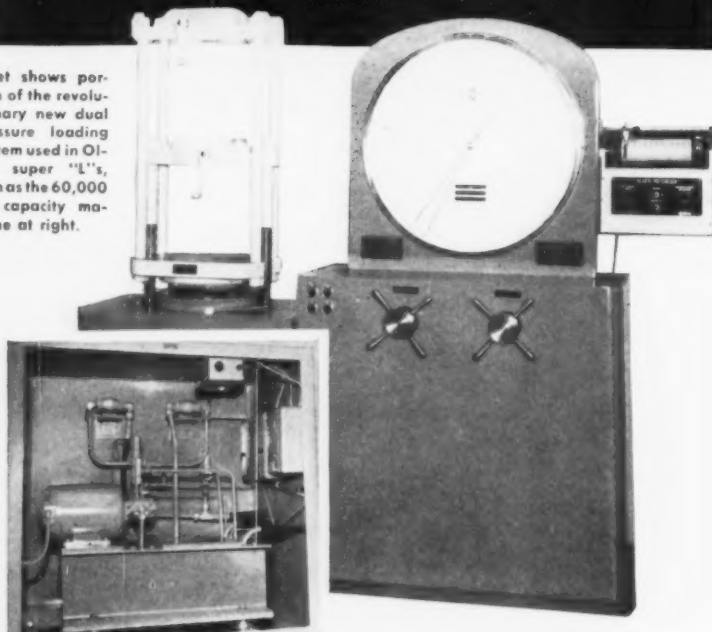
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TESTING MACHINE COMPANY

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Testing and Balancing Machines

AISE MEETING

"New Combustion Process for Temperature Uniformity in Heat Treating Furnaces," by F. C. T. Daniels, Consultant, and Steve Stasko, Assistant Chief Metallurgist, Mackintosh-Hemphill Div., E. W. Bliss Co., Pittsburgh, Pa.

9:00 AM—MECHANICAL SESSION—

MONONGAHELA ROOM

Chairmen: H. R. Knust, Assistant General Manager, Bethlehem Steel Co., Sparrows Point, Md.; L. A. Fugassi, Assistant Chief Engineer, Weirton Steel Co., Div. of National Steel Corp., Weirton, W. Va.

"Safeguarding Steel Production," by R. M. L. Russell, Assistant Chief Engineer, Factory Insurance Association, Hartford, Conn.

"Some Heavy Industrial Noise Problems, Their Analyses and Solutions," by Richard D. Lemmerman, Manager, and Richard R. Audette, Assistant Chief Engineer, Industrial Sound Control Dept., Koppers Co., Inc., Baltimore, Md.

"Treatment of Liquid Water-Borne Wastes from Steel Plants," by Ross Nebolsine, President, Hydrotech Corp., New York, N. Y.

2:00 PM—OXYGEN SESSION—

URBAN ROOM

Chairman: J. H. Strassburger, Assistant Vice President, National Steel Corp., Pittsburgh, Pa.

"Summary of Operating Results with Oxygen," by J. H. Strassburger, Assistant Vice President, National Steel Corp., Pittsburgh, Pa.

"Benefits of Purchased Oxygen to the Indiana Harbor Works of the Inland Steel Company," by N. R. Kirkdoffer, Superintendent, Power, Steam and Combustion Depts., Inland Steel Co., East Chicago, Ind.

"Economics of Generated Versus Purchased Oxygen for Steel Plant Use," by R. A. Lambert, Superintendent, Steam Efficiency and Combustion Dept., Pittsburgh Works Div., Jones & Laughlin Steel Corp., Pittsburgh, Pa.



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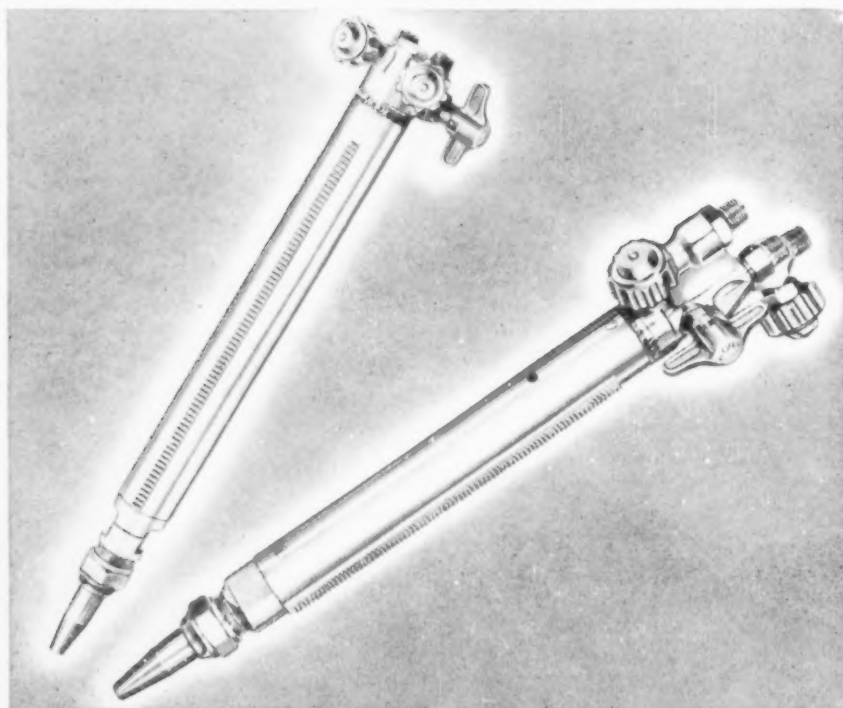


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41

"Oxygen Plant Cycles Tailored to the Requirements of Iron and Steel Producers," by Clarence J. Schilling, Vice President and Chief Engineer, Air Products, Inc., Allentown, Pa.

"Operation and Maintenance of a 100-Ton Double-Cycle, Gaseous Oxygen Plant," by G. T. Wright, Mechanical Superintendent, Dominion Foundries and Steel, Ltd., Hamilton, Ontario, Canada.

"Maintenance Experience with Oxygen Plants at Sparrows Point," by A. Stutzer, General Foreman, Prepared Gases Station, Fuel Dept., Bethlehem Steel Co., Sparrows Point, Md.

2:00 PM—ELECTRICAL SESSION—

MONONGAHELA ROOM

Chairmen: R. T. Lucas, Electrical Superintendent, Weirton Steel Co., Div. of National Steel Corp., Weirton, W. Va.; C. L. Squier, Assistant Electrical Superintendent, Bethlehem Steel Co., Lackawanna, N. Y.

"Recent Hot Strip Mill Roughing Trains," by John H. Greiner, Application Engineer, Electrical Application Dept., Allis-Chalmers Manufacturing Co., Milwaukee, Wis.

"Practical Aspects of Power Lay-outs for Steel Mills," by A. J. Mosso, Vice President, Auburn & Associates, Inc., Pittsburgh, Pa.

"Constant Horsepower Computer—Permitting the Use of Slip Coupling for Winder Drives," by P. R. Gravenstreter, Electrical Engineer, The Clark Controller Co., Cleveland, Ohio.

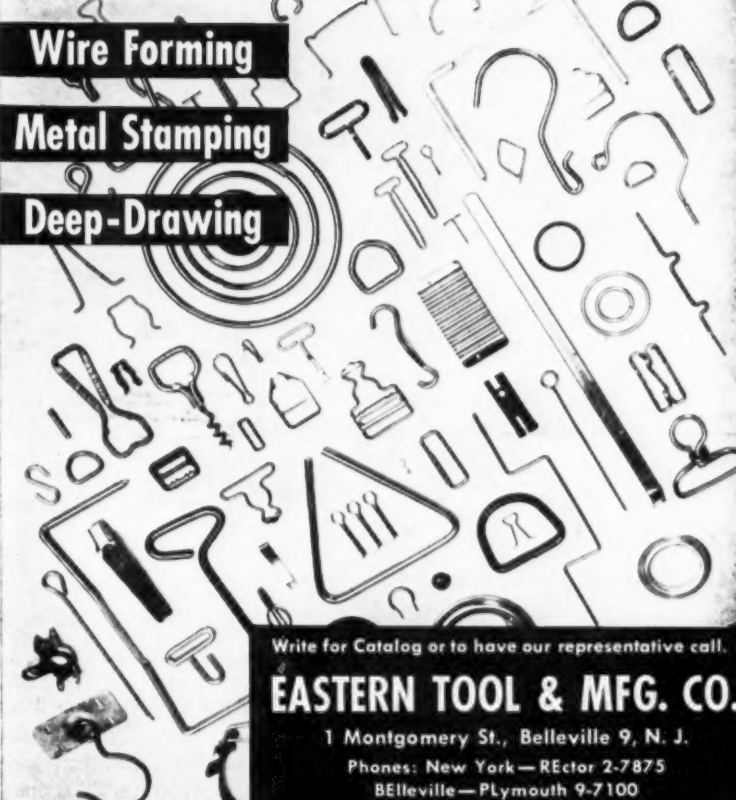
LADIES PROGRAM

All Ladies Program events will be held in the Hotel Penn Sheraton, Parlors E-F. These include: a tea on Monday, Sept. 23; luncheon on Tuesday; and a Kaffee Klatsch and formal dinner dance on Wednesday. General chairwoman is Mrs. R. B. Schnure; Mrs. J. D. O'Roark is honorary chairwoman.

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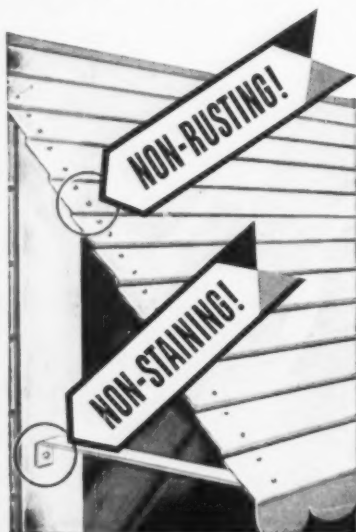
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AISE PAPERS

Discuss Engineering Progress, Problems

Papers to be delivered at the coming AISE convention deal with many varied subjects. They cover virtually every phase of the metalworking industry.

Following are a few abstracts from the technical papers:

Jet Flame Atomizes Openhearth Fuel

Energy from a jet reaction flame successfully atomizes liquid fuels in open-hearth furnaces. Extensive tests covering 700 to 800 open-hearth heats show this method of fuel atomization to be both practical and economical. Compared with standard steam atomization, jet atomization increases steel production, and lowers fuel consumption with up to 30 pct higher firing rates.

The jet burner utilizes a hot gaseous flame at high velocity to atomize and preheat the main liquid fuel before burning. Hot gases and energy of the jet are obtained by burning a small amount of gaseous or liquid fuel with air or oxygen under pressure in a specially designed combustion chamber. This is located in the rear of the burner.

Atomization of the main liquid fuel is then accomplished by injecting the liquid fuel directly into the hot gas stream. Temperature and velocity of the jet flame depend on operating conditions. It varies in the ranges of 3000 to 4000°F and 1000 to 1500 fps, respectively.

Major Differences—Principal difference between jet and steam atomization is this: jet atomization produces a faster burning flame at a higher temperature with increased

thermal radiation to the bath. Three factors are responsible for this condition: (1) temperature of steam atomized oil is approximately 300 F, compared with 900 F or more for jet atomized oil, (2) steam decreases the available heat in the high temperature zone through absorption of sensible heat and consumption of heat of chemical dissociation, and (3) oil subjected to the high temperature of the jet flame undergoes pyrolysis and vaporization in addition to atomization.

"Openhearth Fuel Atomization With Reaction Type Jet Burners," by G. W. Hinds, development engineer (metallurgy) and A. L. Hodge, staff engineer (metallurgy), development laboratory, Linde Co., Div. of Union Carbide Corp., Newark, N. J.

Continuous Casting Keeps Costs Down

Continuous casting of semi-finished products has been attractive to the steel industry for many years. Its advantages include: low initial cost per ton of installed capacity, low operating costs, and relatively high yield from molten steel to semi-finished product.

The process is operating commercially in several steel plants, primarily abroad. On the basis of techniques and equipment developed in these installations, a sound approach to the design of a plant for producing large tonnages may be defined.

Some Thoughts—Basic considerations are: presently successful equipment and operating techniques; the nature and practices of

the melt shop with which the plant is to be allied; and anticipated future developments. As a first step, the limiting dimensions of a single strand must be established, including machine speed, width and thickness of the cast section, casting rate, machine availability and annual capacity.

From these, and the size of the steelmaking furnace, the number of strands required to cast one heat of steel in one hour is determined. The tap-to-tap time for a single furnace, the number of furnaces in the melt shop, and the metal availability will establish the number of casting units required in the plant.

"Design of a Large Tonnage Continuous Casting Plant," by Rufus Easton, manager continuous casting section, Freyn Dept., Koppers Co., Inc., Pittsburgh, Pa. and Harold E. Skelley, power and fuel engineer, engineering dept., Inland Steel Co., Indiana Harbor Works, East Chicago, Ind.

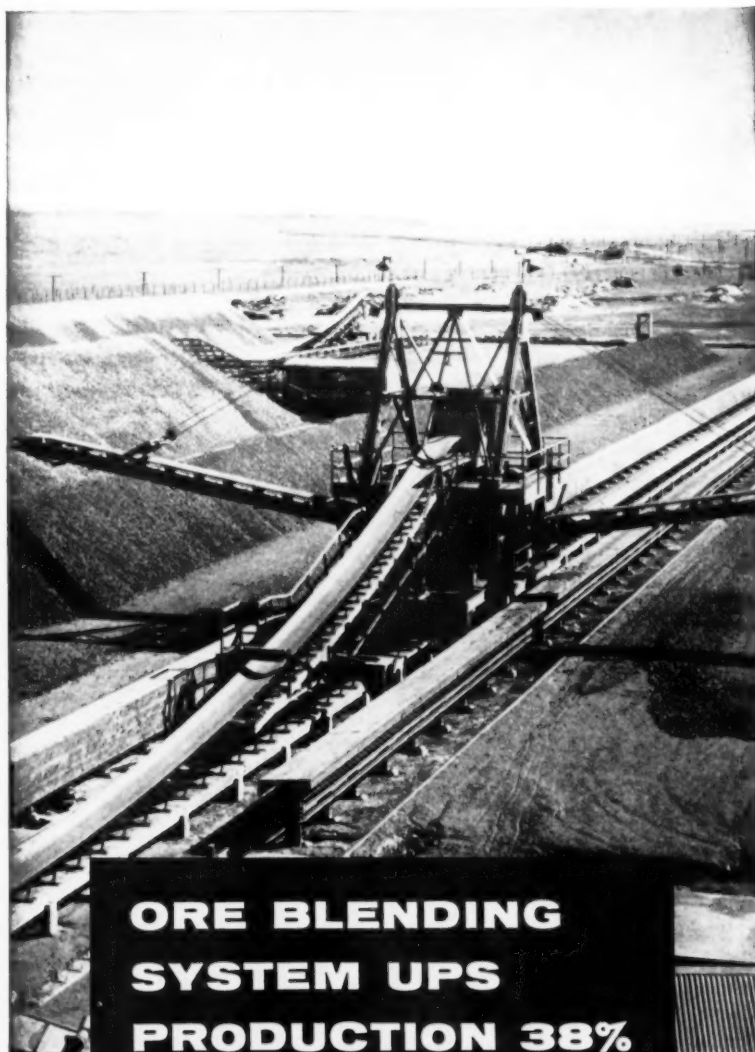
How To Select Temper Mill Units

Temper mills include mills ranging from simple, slow single-stand sheet mills to complicated high-speed two-stand tin-plate mills. This paper gives an insight into problems to be considered when electric equipment is selected for such mills.

The procedure for selecting machine size is clarified by sample calculations. Complete machines are considered including field range and possible physical specifications and limitations. Possible types or arrangement of power supply are discussed. Ratings of some existing mills are presented in a form to allow a quick comparison with any contemplated mill.

Control Setups—Various conventional control systems are functionally described. So are special features which are available for such systems.

Some thoughts are presented as to possible future developments of temper mill equipment; how auto-



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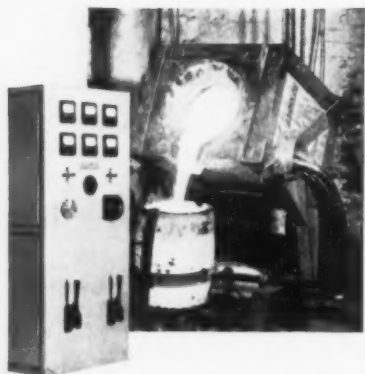
The entire system, including 34 belt conveyors, 11 feeders, 7 crushers, 7 screens, and a double-wing stacker, was designed, engineered, and manufactured by Hewitt-Robins. To find out how H-R products and services can help you, consult your classified telephone directory for the nearest H-R representative, or contact Hewitt-Robins, Stamford, Connecticut.



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ALISE PAPERS

mation may be applied in this general area is looked into.

"Selection of Electric Equipment for Temper and Skin-Pass Mills," by J. E. Peebles, J. J. Remley, and R. B. Eggleston, steel mill engineers, systems application engineering section, General Electric Co., Schenectady, N. Y.

Steel Industry Offers Paradox

There is a paradox in the steel industry today. Despite record dollar profits, the industry has pressing financial problems. Dollar income after taxes for both 1955 and 1956 was in excess of 1,000,000,000; yet capital requirements are so great that the proper replacement and modernization of plant and equipment present difficulties.

The problem arises from increasing costs, declining purchasing power of the dollar and inadequate depreciation reserves. The cost of replacing plant and equipment has risen 100 to 200-pct in the last 15 years. Depreciation reserves can provide only one-third to one-half of replacement requirements, and thus supplementary funds must be acquired. These were obtained in part from five year write-offs permitted by certificates of necessity, but this source has almost dried up.

Money From Where—The source of new funds could conceivably come from three sources:

1. Borrowed money—this might be possible for one or two years, but is unsound as a continuing practice and would lead to bankruptcy.

2. An issue of additional stock—such a practice, if adopted for the mere replacement of assets, would dilute the equity of current stockholders in the physical plant. Further, it is difficult to see how anyone would want to buy stock in a company which is not making enough to replace its plant and equipment.

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3. The investment of retained earnings—the course followed by most companies.

The possible remedy for depreciation problems lies in a realistic tax policy. This should be based on the fundamental concept of depreciation which was evolved from the fact that capital wears out at a fraction of its value each year.

"The Replacement of Steel Mill Plant and Equipment With Present Depreciation Reserves," by William T. Hogan, S. J., economics prof., director, Economics Program, Fordham University, New York, N. Y.

Sensible Pickling Can Save Dollars

Pickling situations may be classified by two criteria. The type of pickling machine involved and the capacity in terms of spent solution produced are these. The latter may range from less than 5000 gal per week to over 200,000 gal per day.

Both the type and capacity must be further subdivided by the analysis of the metal processed and therefore by the acid used to effect scale removal.

Two Basic Methods—Treatment methods are also of two general types, destructive and regenerative. Of the destructive variety, neutralization and hauling for disposal are among the most common.

Regeneration by the removal of ferrous sulfate heptahydrate or by the removal of the monohydrate are among the most widely practiced methods for recovering the free acid value of the spent liquor.

Not Obvious—The selection of the particular treatment to be applied to a specific pickling situation is not always obvious. You must look into the technical, functional and economic factors.

Since economics are the fundamental basis for any selection, cost studies for each process are important.

"The Dollars and Sense of Pickle

Liquor Treatment," by James S. Joseph, sales engineer, and Elbert T. Culver, senior process engineer, chemical dept., Engineering and Construction Div., Koppers Co., Inc., Pittsburgh, Pa.

Reviews Ore Reducing

This paper discusses in a general way the reduction of iron ore to produce a charge material for steel and iron making furnaces. It deals

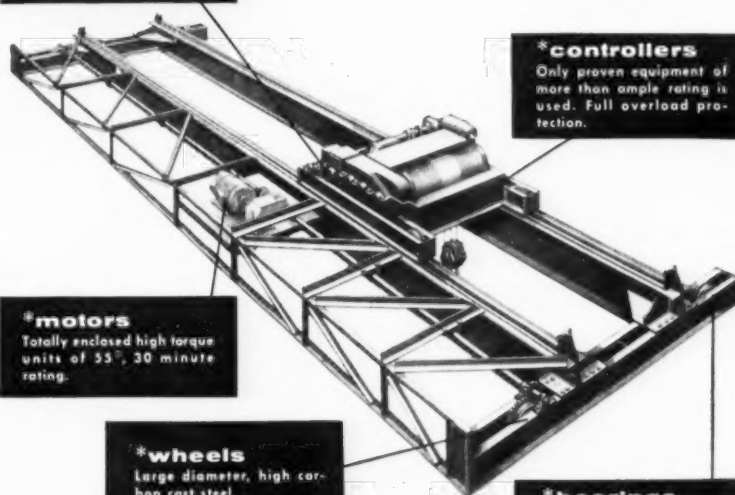
with practices which seem to be in highest repute at the present time. Reviewed also are probable comparative future positions of the blast furnace and other methods of recovering iron from iron oxide.

The advantages of hot metal and the procedure to follow to obtain it are discussed. So also is the procedure necessary to obtain a cold metal direct from the ore. The economics of treating molten iron ore and its value in the integrated steel

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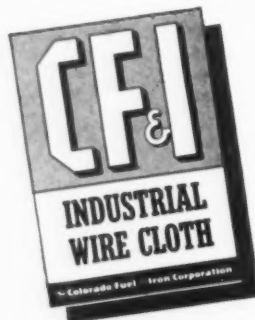
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AISE PAPERS

mill are analyzed and compared with the reducing gas treated pulverized hot iron oxide.

"Modern Methods of Iron Ore Reduction," by H. W. McQuaid, consulting metallurgical engineer, Cleveland, Ohio

Helium Injection Ups Annealing Rate

You can increase heat conduction of coil stock. Here's how: inject helium into the space between layers of strip wound in coils. This displaces air originally present. Result is a five-fold increase in the capacity for conducting heat radially inward or outward.

This, of course speeds up heating and cooling, and increases the output of annealing bases and covers, without requiring the use of high-power recirculating fans.

Sample Test Run—A demonstration with identical coils, about 4-in. in diam, of 0.009-in. thick cold-reduced steel strip, both coils being supplied with heat at the same rate, showed a remarkable decrease in the time required for heat to penetrate the helium-injected coil as compared with the ordinary air-containing coil.

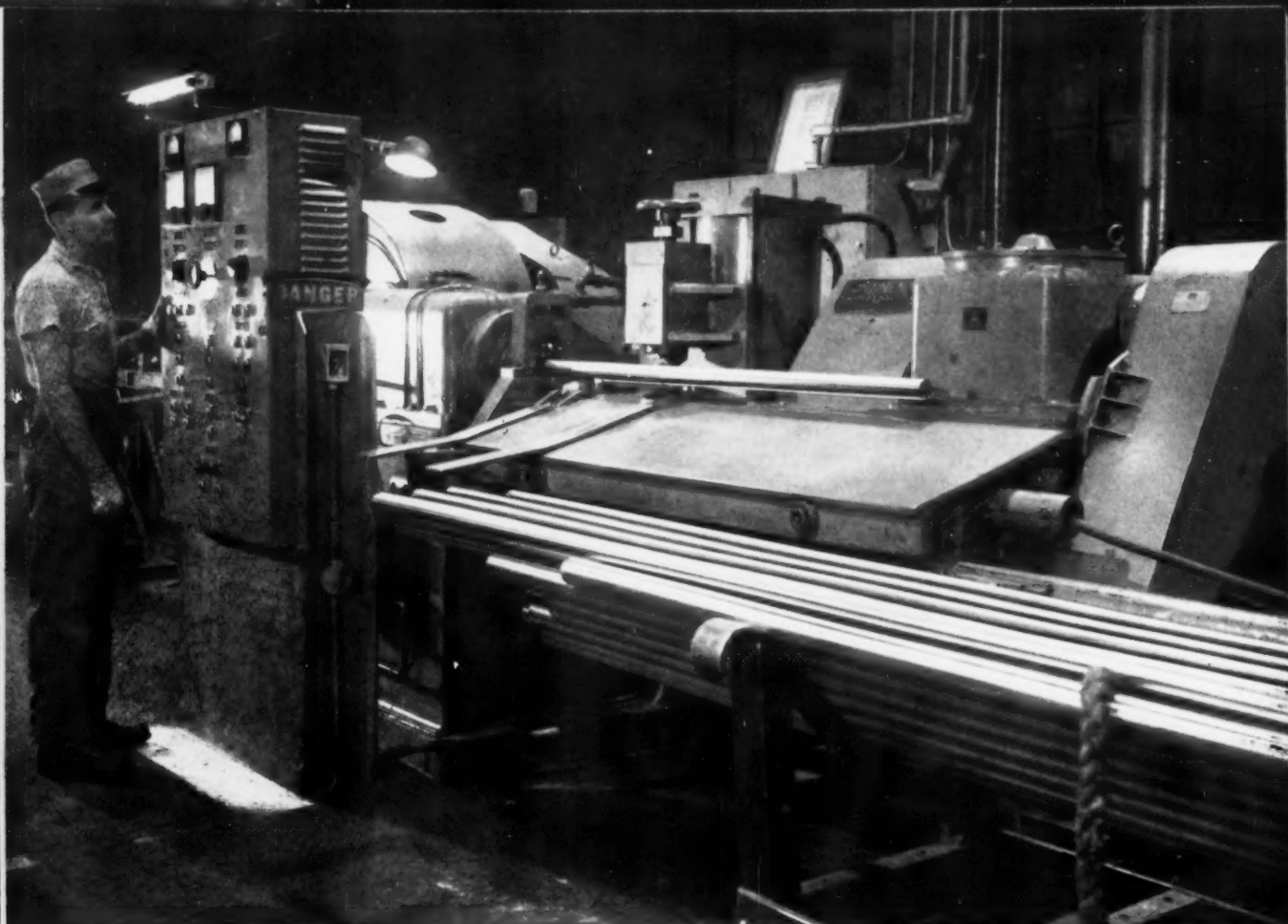
Economically, the process is attractive. Although helium is a fairly expensive gas, little of it is needed to fill the 3-pct void spaces in the coils (about 1/8-cu ft per ton of strip).

"Fast Annealing of Sheet-Strip Coils With Helium Injection," by J. D. Keller, partner, Associated Engineers, Pittsburgh, Pa.

Central Spray Lube

In this paper the early history of centralized spray lubrication systems is traced to show how the initial successful installations led to widespread adoption of the equipment.

The operation of the measured



This Medart Centerless Bar Turner is a recent addition to the cold finishing department of an Eastern specialty steel mill. It is capable of turning at speeds of 12 feet per minute and removing as much as $\frac{1}{4}$ -inch of metal.

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the cutter head. This creates positive tension on the bar giving a superior finish.

The Blaw-Knox Medart RFPD Centerless Turner accommodates either Carbide or Oxide Tools. Its output, for any type of alloy steel or non ferrous metal is limited only by the ability of the cutting tool. What's more, the problem of chip handling and disposal has been simplified. The cutting tool scores the bar longitudinally so that chips are broken into easy-to-handle lengths. Blaw-Knox Medart Centerless Turners are available in sizes to accommodate bars from $\frac{3}{8}$ " to 9" diameter. Contact us for complete details, and technical assistance or service.



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AISE PAPERS

spray mechanism is described. Different types of nozzles are discussed. The theory of nozzle spacing and arrangements with respect to the gear is covered.

"Development and Application of Spray Lubrication," by E. J. Gesdorf, senior application engineer, The Farval Corp., Cleveland.

Generate Own Oxygen Or Purchase It?

This paper discusses the economics of plant site generated high purity oxygen versus purchased oxygen.

At the Pittsburgh Works division of Jones & Laughlin, a fully integrated steel plant, the total oxygen requirements at 100-pct operating rate average upwards from 75,-

000,000 cu ft per month. This is based on oxygen use for decarburization purposes on 21 open hearth furnaces and for mechanical billet scarfing and mechanical slab scarfing.

Consumers Vary—In addition to these major consumers, there is an appreciable amount used for miscellaneous burning and welding throughout the plant.

Oxygen transmission lines are used extensively throughout 95 pct of the plant area. Five main distribution lines leave the oxygen generating plant. One 8-in. line supplies the mechanical slab scarfer only. Another 8-in. line supplies the No. 4 open hearth shop consisting of eleven 275-net ton furnaces for decarburization purposes only. A 3-in. oxygen line extends across the interplant bridge over the Monongahela River to supply all the North Side plant requirements. Very little bottled oxygen is used.

Uses Four Plants—Four 25-ton per day capacity oxygen units comprise the present generating plant with space provision for two additional units. A 1,000,000-cu ft capacity reserve storage for gaseous oxygen is also included.

Generating and distribution systems are well metered.

"Economics of Generated Versus Purchased Oxygen for Steel Plant Use," by R. A. Lambert, superintendent, steam efficiency and combustion dept., Pittsburgh Works Div., Jones & Laughlin Steel Corp., Pittsburgh, Pa.

How O₂ Plant Works

This paper describes the flow sheet of a 100-ton, double cycle, gaseous oxygen plant. It gives temperatures, pressures, and volumes at the compressors, regenerators and the high and low pressure columns.

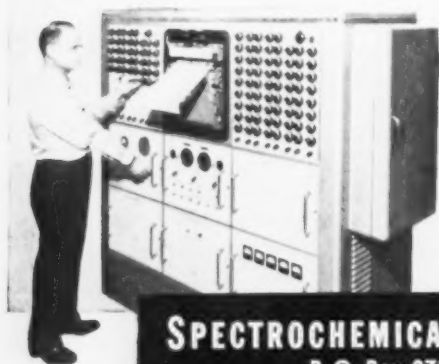
Maintenance of the rotating equipment is described as well as two examples of maintenance inside the cold box.

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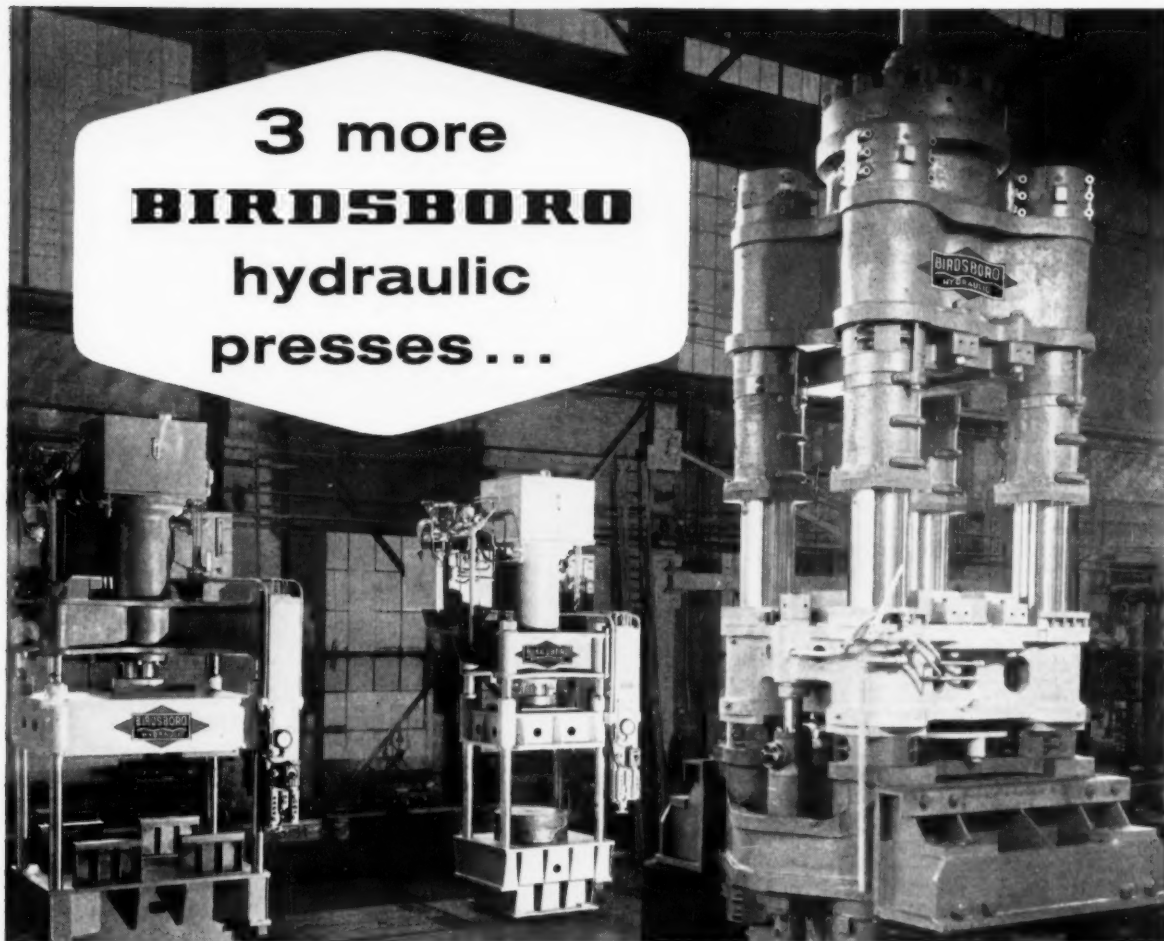


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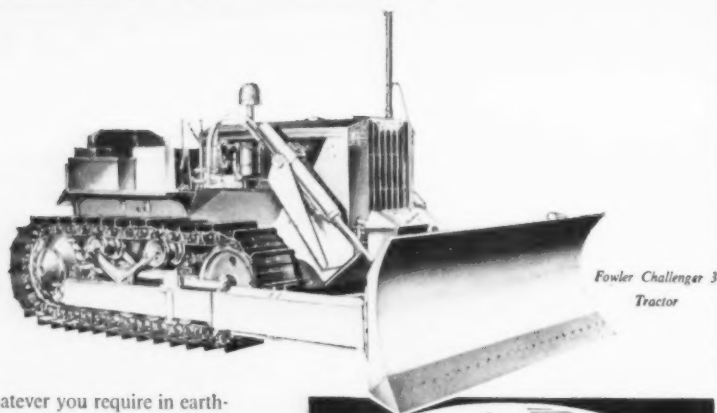


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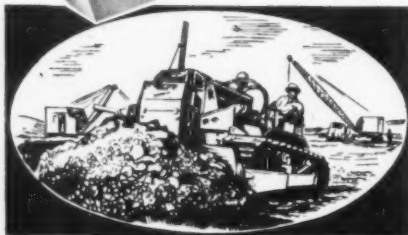
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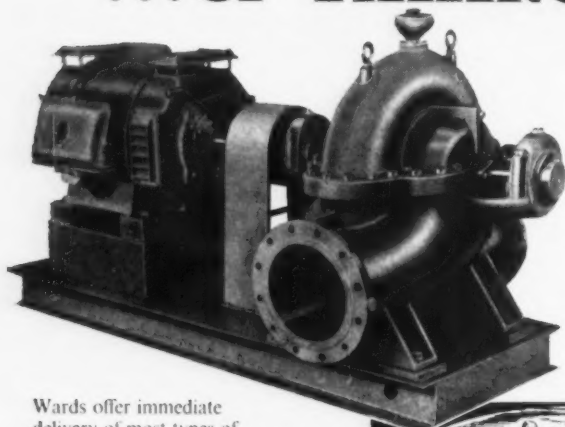
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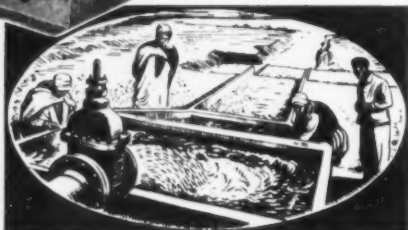


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ALSE PAPERS

a 100-ton Double Cycle, Gaseous Oxygen Plant," by G. T. Wright, mechanical superintendent, Dominion Foundries and Steel, Ltd., Hamilton, Ontario, Canada.

Furnace Repair Men Must Plan, Recheck

This paper furnishes a general description of techniques, innovations, and methods used in blast furnace repairs at the Sparrows Point plant of the Bethlehem Steel Co.

All phases of the job, including planning, preparation, and performance of the relining are reviewed. Special emphasis is placed on materials-handling systems and time-saving procedures.

Check and Recheck—In order to rebuild blast furnaces efficiently and economically, thorough planning is necessary. Coordination between engineering, blast furnace, electrical and mechanical departments is the forerunner of a smooth functioning job.

Of prime importance to a fast relining job is complete preparation. All materials must be neatly stocked at accessible locations. All checking and fitting of prefabrications should be done before use. Shaped brick for keys, miters, etc., is cut and clearly marked prior to the time it is needed.

Advance Jobs Done—Electricity, air, oxygen, water and other service items are made available before the furnace is blown down. Carbon-lining blocks are preassembled to assure dimensional accuracy. Hoisting machinery is anchored in place and rigging hung where possible. Foundation alterations to auxiliary units are made while the furnace is still in operation.

Railroad tracks are reconditioned at a convenient time before the repair is started. Tool and equipment repairs are made before the

tools are delivered to the job site.

Move Bricks Fast—Of prime importance to the relining is a fast, efficient means of handling material to the bricklayers in the hearth and stack.

Also presented in this paper are facts and methods of procedure concerned with furnace auxiliaries and their repair, structural steel-work of the furnace proper, "drying out," and other related parts of the job.

"Techniques in Rebuilding a Blast Furnace," by C. F. Bessent, supervisor, mechanical maintenance dept., Bethlehem Steel Co., Sparrows Point, Md.

Noise Irks Workers, Causes Damage

Industrial noise problems seemingly have arisen only recently to plague both management and safety engineering personnel. In reality, such problems are not new ones. Rather, instead, the cognizance of noise as a major industrial problem is new.

Increased economic pressures through the new proximity of residential areas in the case of the residential noise problem and the results of ear damage compensation claims, together with union demands for improved working environments, have spurred more recent interest in the noise problem.

"Some Heavy Industrial Noise Problems, Their Analyses and Solutions," by Richard D. Lemmerman, manager, and Richard R. Audette, assistant chief engineer, industrial sound control dept., Koppers Co., Inc., Baltimore, Md.

Strip Headaches Can Be Solved

Problems encountered in hot strip mills are many. They vary with mill conditions.

The following include such problems:

(1) The increase of furnace production through changes to exist-

new . . . booming . . . stainless steels
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New, high-manganese stainless steels are catching on fast. Their lower costs and better mechanical properties are just one reason. Producers and fabricators of the old high-nickel 300 Series alloys, now able to minimize the effects of nickel shortages, are switching to the new 200 Series. Others who have long looked with interest at stainless, but were discouraged by possible shortages, are adding to the growth.

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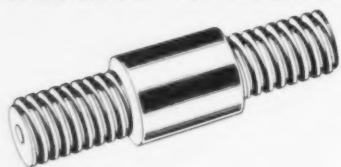
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26

AISE PAPERS

ing furnaces by means of minor alterations to furnace design.

(2) Reduction of furnace outage time and the subsequent cost reduction through substitution of 3-in. double extra strength skid pipe.

(3) Increasing roll life by means of proper water distribution and increased water pressures.

(4) Changes to runout table quenching spray system in order to meet metallurgical requirements when rolling heavy gage coil for line pipe.

(5) Roll contours in relation to problems dealing with shape.

"Some Practical Solutions to Hot Mill Problems," by R. A. Smith, assistant general foreman, and A. D. Patton, assistant to general foreman, 96-in. Hot Mill, Pittsburgh Works Div., Jones & Laughlin Steel Corp., Pittsburgh, Pa.

Mill Power Plants Get Bigger, Better

This paper points out the magnitude of power required for steel production. It discusses the necessity for steel mill power plants and their importance to the industry. It reviews the changes which have taken place over the past ten years and stresses the need for more efficient production and use of steam and electric power.

Steps already taken by the industry toward this end are outlined as well as additional methods now being considered.

The steel industry is currently following the general trend to larger steam generating units and higher pressures and temperatures for generation of by-product power from steam required for steel production. The increasing use of, and conversion to, 60-cycle equipment permits ties with local utilities to supply power requirements over amounts economically generated in the steel mill plant.

Reduces Steam Needs—Replacement of obsolete blast furnace blowing equipment and new construction with turboblowers of increasing capacity have reduced steam requirements. The use of blast furnace gas turbines for air blast is under consideration. Control and conservation of cooling water can result in reduced pumping power.

The trend is to higher initial steam pressures and temperatures, and larger capacity units of high efficiency as steel mills continue to increase in size. The use of steam at 1250-psig and 975 to 1000°F should not be unusual within a short time. Equipment and procedures now used by the utility industry for improved efficiency will come into common use in steel mill power plants.

"Trends in Steel Mill Power Plants," by Howard G. Kitt, senior power engineer, and Robert W. Worley, chief power engineer, United Engineers & Constructors, Inc., Philadelphia, Pa.

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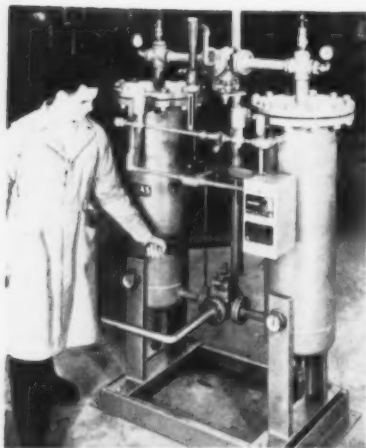
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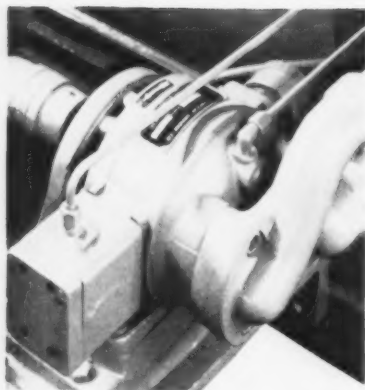


Dehydrators Dry Instrument Air, Process Gas

Steam-reactivated dehydrators dry instrument air or process gas with equal efficiency. Available in 11 sizes, they handle from 10 to 1000 scfm (air at 70°F and 100 psig) in continuous operation. Featuring manual, semi-automatic or automatic cycling, the units operate on an 8-hour reactivation cycle. Manual and semi-automatic models require attention only at the change of shift, assuring regular inspection. Tower inspection and desiccant charging are simple; desiccant

changes and other maintenance can be done without disturbing the steam coil. Several "extras" are available as standard accessories. These include: a special desiccant, diaphragm-operated steam valves in place of solenoid valves, all-welded fittings, 250-psi construction, thermal operated cycling or semi-automatic models (eliminating electricity) and a metal enclosure. (Selas Corp. of America).

For more data circle No. 41 on postcard, p. 161

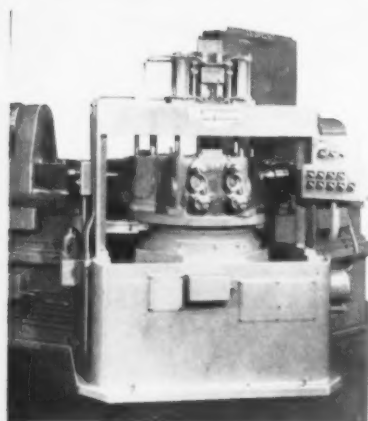


Hydraulic System Reduces Grinder Distortion

If you suffer from heat distortion on your surfacing grinders, maybe a new hydraulic system will help. Oversimplified, here's what happens when hydraulic heat distorts a surface grinder: coolant, splashing and evaporating on the top surface of the work table keeps that surface's temperature down. Heat generated by the hydraulic system, however, is absorbed at the table's bottom surface. Then the cool top surface

of the table contracts; the hot bottom expands; the whole table becomes concave or dish-shaped. Result: inaccuracy, distortion; the system is actually defeating its own purpose. The new system halts this. Operating at not over 3°F above ambient room temperature, it allows closer tolerance working. (Thompson Grinder Co.)

For more data circle No. 42 on postcard, p. 161



Multiple Borer Performs With Precision

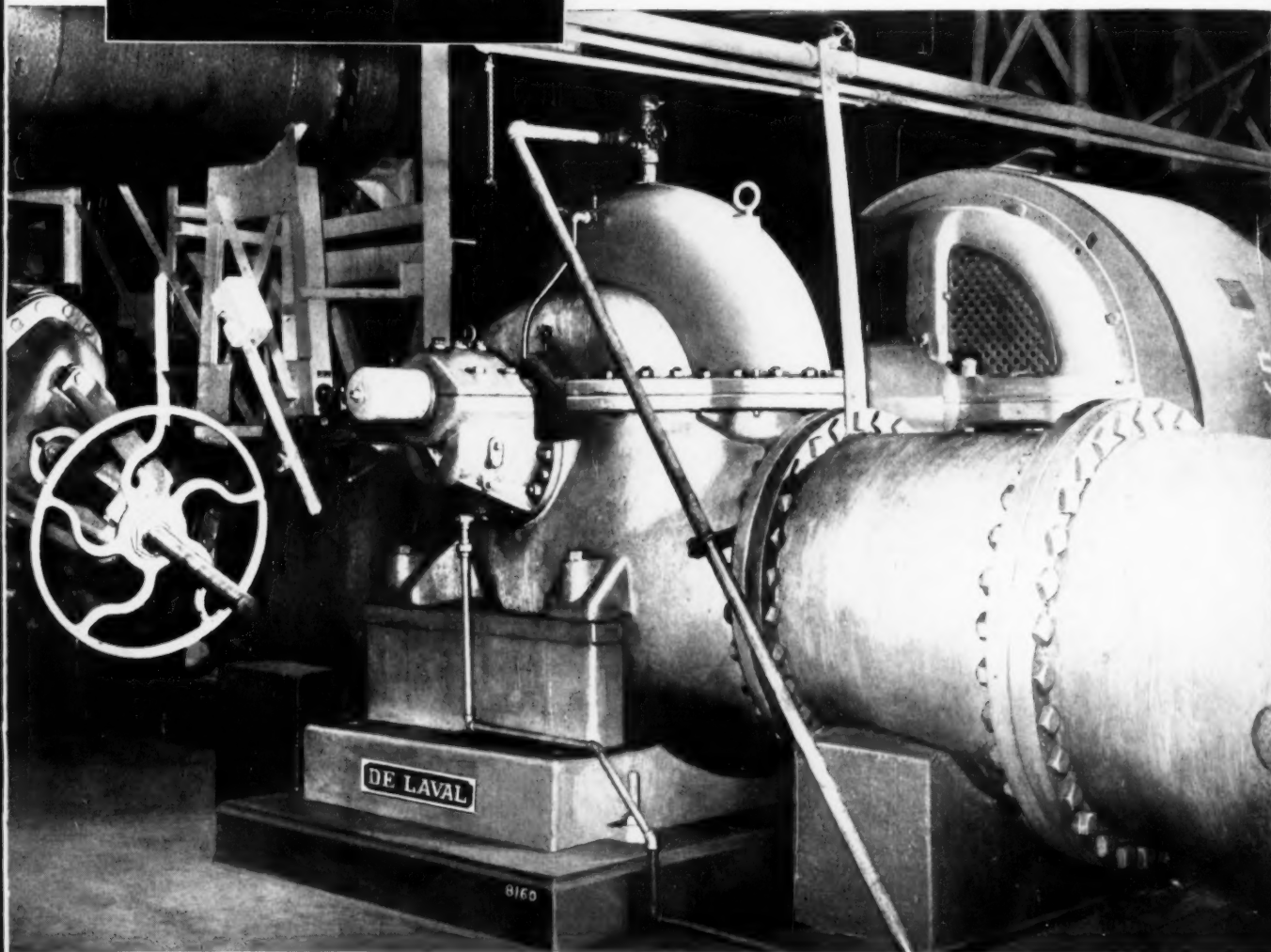
Precision is the key feature of this boring machine. It performs multiple operations on automotive body rear band servos and other similar equipment. In operation, it works like this: a worker loads two parts on the machine. He presses a button that actuates a clamp and starts the work cycle. The machine then indexes to the next station. Here, both parts are rough bored, grooved, and an angle is formed. At the next station, the part is

finish bored to ± 0.0005 in. Rate of production, at 100-pct efficiency, is 220 pieces per hour. The entire operation is controlled from one electrical pushbutton panel located at the front of the machine. Engineering features include: hardened and ground steel V-ways, hydraulic tank and controls located outside the base for easy accessibility. (The Olofsson Corp.)

For more data circle No. 43 on postcard, p. 161

DE LAVAL
CENTRIFUGAL
PUMPS

*in service since 1911
at Inland Steel Co.*



De Laval Centrifugal Pumps have a record of dependability at the Inland Steel Co., which goes back forty-five years. In that time, De Laval has supplied this major producer with pumps for practically every steel mill service—*more than 75 units in all*. The photograph shows one of the largest De Laval pumps on the line at the East Chicago, Indiana plant of Inland Steel. The unit delivers 20,000 gpm at 120 ft head.

De Laval Centrifugal Pumps are available for a wide range of applications in all types of metal-working plants. Types L, M and P single stage double suction pumps can handle capacities from 1,000 to 20,000 gpm and heads to 350 feet. Larger De Laval units of any capacity to meet any requirement for steel mill service are available.



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giving performance and
application data.*



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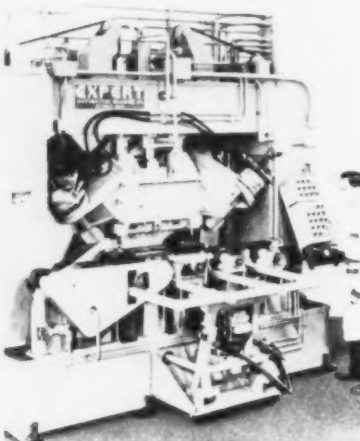


Presses Handle Severe Forming Operations

Severe forming operations are handled by a quartet of new presses like this one. In operation as part of a production line in a large auto-maker's plant, the 1500-ton presses work two bumpers at a time. The line performs the following: (1) drawing, (2) rough trimming, (3) restriking and cupping and (4) parting—separation of two connected bumpers. Operations two and three are done by the new press units. The presses are single action, underdrive machines with 156 x 60-in. bed

dimensions. Finish trimming is the fifth operation in the line. Because only one piece can be trimmed at a time, while the first four presses process two at each hit, two duplicate trimming presses are required for each line to match the production rate of the new presses. Each line consists of six presses, two of which are basically the same model as this 1500-ton forming unit. (Hamilton Div., Baldwin-Lima-Hamilton Corp.)

For more data circle No. 44 on postcard, p. 161



Forming Unit Makes Four Bends in Bar at Once

This three station, in-line transfer machine produces four bends and contours in hot rectangular steel bars during one station operation. The reason for performing all bending and contour forming at one station is this: it allows complete forming of the part while it is at the required bending temperature. At the work station, an overhead hydraulically operated ram carries out one bending while a hydraulically operated die set does the three remaining bending operations.

This type design lets the machine adapt to a variety of parts needing various bends and contours. Changing the die set does this. A typical use for the machine is the forming of automotive bumper support arms; it works these at a 500-per hour rate. The machine occupies a floor space of about 5 x 10 ft; it's 11 ft high. Two 15-hp hydraulic power units operate all movements of the setup. (Expert Automation Machine Co.)

For more data circle No. 45 on postcard, p. 161

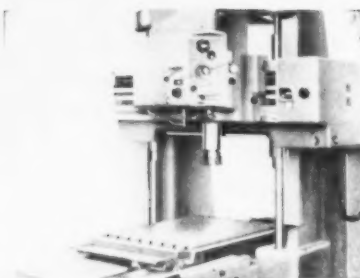


Shearwelder Buttwelds Two Coil Ends Rapidly

Growing use of coiled tinplate by canmakers has spurred development of this high speed shearwelder. It buttwelds two coil ends in about 40 seconds. Evolving from an older type machine used to weld silicon and stainless steels, the shearwelder

can join ends of coils or connect sections when an imperfect part has been cut out. It handles tinplate down to 0.006 in. It welds with an inert gas, shielded electric arc weld. (McKay Machine Co.)

For more data circle No. 46 on postcard, p. 161



Jig Borer-Miller Combines Accuracy, Speed

Accuracy at high production rates is the key feature of this jig boring and milling machine. It's so precisely made that the accuracy of displacement for all settings of the work table and spindle head is guaranteed to be within one half ten thousandths of an inch. And

the machine's production is up 10-pct over earlier models. This increase is accredited by the maker to added rigidity of design, a completely new spindle head with a heavier quill, and automatic clamping features. (American Sip Corp.)

For more data circle No. 47 on postcard, p. 161

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Ample and diverse stock of ingots made of ALCO steel is maintained at Latrobe, Pa. plant

INTEGRATED PRODUCTION ASSURES TOP QUALITY IN ALCO FORGED FLANGES

ALCO meets flange needs with production of steel in any carbon, alloy or stainless grade; you get flanges that are uniform in metallurgy, forging and finishing

Every step of ALCO flange production is given careful attention, from charging the open hearths to final inspection and test. This complete integrated control is important to you because it results in uniformity that saves you money in welding, preheat and postheat operations. It means faster delivery of flanges, too.

*Production of top-quality flanges at ALCO incorporates the most modern steelmaking, forging and rolling techniques. Strict quality control checks are made at every stage to insure exact conformance to specifications.

ALCO flanges are available in standard sizes and types from 18-in. OD to 145-in. OD. Stocks are maintained in Latrobe, Pa. and Beaumont, Texas. "Specials" are produced on order and quickly. Your nearest ALCO representative can give you complete information—or write today for our catalog. Spring & Forge Division, Dept. FL-2, P.O. Box 1065, Schenectady 1, N. Y.



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THE ideal glass furnace is one which can be counted on to wear out evenly and uniformly, giving the operator the full potential value of every brick in every part of the tank.

Until a few years ago, however, such a tank was considered an obvious impossibility.

When Corhart Electrocast was first offered to the trade as a much superior glasshouse refractory, our new customers began using it to strengthen those portions of their furnaces which had always been the limiting factors in producing life.

This idea proved successful, but at the end of the fire, the Corhart was usually in such good shape that the natural result was to fortify the next weakest portions. This step-by-step process has now been followed through to its logical conclusion by most of our original customers: namely, the gradual increase of Corhart to a point where the life of the

former weak portions approximates the life of the easy-service portions. This ideal construction, with the judicious use of Corhart Electrocast, has led to what is termed "The Corhart Balanced Unit."

A Corhart Balanced Unit can be fabricated for a surprisingly small percentage increase in first cost. This percentage increase represents only a fraction of the increased life and total tonnage output.

Corhart Balanced Tanks are now widely used throughout the industry. More than sixty are now in service—and this, of course, is in addition to the dozens of installations in which Corhart is used as a spot refractory. Write us today for the complete facts and figures on a Corhart Balanced Tank of your company's type. Full designs, specifications and quotations will be gladly furnished, without obligation. Address: Corhart Refractories Co., Incorporated, 16th & Lee Sts., Louisville, Ky.



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THIS ad appeared more than 25 years ago—in January, 1932. At that time Corhart Electrocast was still so new in the glass industry that only a few of the most progressive companies dared buy it. It was, and still is, "one of the world's highest-priced refractories". Yet now its use is practically universal . . .

Today Corhart 104 is new in the steel industry. Like its glass-industry counterpart, it too is "one of the world's highest-priced refractories". Yet it offers open-hearth furnace operators the same opportunities for greater production and lower costs that Corhart Electrocast brought to the glass industry.

May we send you all the facts? Address: Corhart Refractories Co., Incorporated, 1620 West Lee Street, Louisville 10, Kentucky, U.S.A., SPring 8-4471.



**CORHART 104
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The Iron Age Summary

Steel Buyers in Driver's Seat

Market shows slow but steady improvement. But the customer still calls the turn.

Steel's continuing expansion a factor in generally easy market.

■ Steel demand is showing a slow, steady improvement this week. But steel buyers are still in the driver's seat except in plate and structurals. A continued pickup in demand is expected the balance of the year.

The market is shaping up to the advantage of steel users. It looks as though they'll be in a position to call the turn for some time to come. A sudden upsurge in automotive demand could change this picture. But for the moment, at least, the carmakers are stepping up their orders at a gradual pace.

Expansion Factor — Oddly enough, the mills' continued expansion of melting and finishing capacity is perhaps as big a factor

as any in the present buyer's market. It explains why steel users are able to take an independent attitude toward producers while chewing up tonnages at a possible record pace.

Steel consumption this year may set a new record, or at least hold to a level comparable with 1956. A consumption figure of 84 million finished tons usually is mentioned. This would include steel used from inventory.

Buyers Benefit — Steel buyers are taking advantage of increasing capacity to cut their own costs. They are able to hold down their inventories because they know the steel will be there when they need it.

If steel's planned expansion and modernization are carried out, 1959 industry capacity will be up about 12.2 million tons over this year. (See page 99) This means that steelmaking potential will be around 145.6 million ingot tons—an increase of nearly 60 pct since 1947.

Construction Strong — The continuing strength of the construction market has thrown some mills off balance. They admit they have allocated more tonnage than they are in a position to ship. This means that more raw steel will have to be shifted into structural shapes in the weeks ahead.

The mills are walking a tight-rope to avoid being caught off guard should a sudden groundswell develop in demand for sheet and strip. Those that have been rolling light plate on sheet-strip mills are trying not to overextend themselves on commitments.

Warehouse Picture — The direction of the warehouse sales level is generally up. Big bone of contention is just how fast it is moving up. Some warehouses contend it isn't improving much, if at all. But generally, the bigger houses that have managed to cut down their cold-rolled sheet inventory are feeling a little better.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,100	2,100	2,100	2,487
Ingot Index				
(1947-1949=100)	130.7	130.7	130.7	154.5
Operating Rates				
Chicago	78.5	80.0*	83.5	102.0
Pittsburgh	82.0	81.0*	81.0	98.0
Philadelphia	90.0	89.0	92.0	105.0
Valley	76.0	75.0*	72.5	97.0
West	100.0	101.0	102.0	99.0
Buffalo	100.0	100.0	95.0	104.0
Cleveland	80.0	82.0*	88.0	105.0
Detroit	94.0	93.0*	80.0	108.0
S. Ohio River	87.0	89.0	90.0	96.0
South	73.0	76.5*	85.0	86.0
Upper Ohio R.	96.0	94.5*	81.0	98.0
St. Louis	83.0	86.5	79.0	88.0
Northeast	41.0	41.5*	37.0	100.0
Aggregate	82.0	82.0	82.0	101.0

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.967	5.967	5.967	5.622
Pig Iron (Gross ton)	\$66.42	\$66.42	\$66.40	\$63.04
Scrap, No. 1 hvy (Gross ton)	\$46.67	\$48.50	\$53.00	\$58.83
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	27.10
Copper, electrolytic	27.00	27.00	28.50	40.00
Lead, St. Louis	13.80	13.80	13.80	15.80
Magnesium ingot	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin Straits, N. Y.	93.75	93.25*	94.50	106.00
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

*Revised

Batteries Packing More Power

Industrial battery makers are relying on miniaturization, automation, new linings to give users better products.

In the present market buyers will find deliveries good and prices not likely to go up.

■ Battery manufacturers are concentrating on packing more power into smaller packages. And their biggest successes in this direction have come within the last year or so.

One battery maker suggests that customers now buy on the basis of kilowatt-hours capacity, rather than as heretofore on amperage rating. The big difference, he explains, is that kw-hour capacity tells the voltage that will be maintained during the entire delivery of power. Amperage rating tells only the amount of current available. The reason for the switch? Today's battery will con-

tinue to deliver good voltage for a longer time before needing recharging, as contrasted to batteries of a few years ago which tailed off badly near the end of a shift.

This same company reports that within a matter of weeks it will begin to put silver cobalt into industrial batteries. It has been doing this in the automotive field and getting 30 pct longer battery life.

Miniaturization Impact—Another maker reports a new battery using miniaturization techniques to provide "the highest ampere-hour per cubic inch rating on the motive power market." It provides 44 pct more rated capacity than the same size battery made by this company only 3½ years ago.

For example, a 2000 lb lift truck, now using an 18 cell, 36 volt, 360 ampere-hour battery with 13 plates per cell, can now take the same size unit and get 432 ampere-hours.

The use of a special porous tubing to encase grid spines and the active material facilitates electrochemical action, while preventing the loss of active material.

More Cadmium Units—Nickel cadmium batteries, called the "future of the industry" by a number of battery makers, are more readily available. They are still about four times as expensive as lead composition units, but are much more efficient for applications taking a constant but not heavy load.

Automation Influence—Battery makers have actually gone even further. Charging equipment features more built-in automation to eliminate even the slightest margin of error. Latest units will decide how much recharge a battery needs, and administer just the right dose. It is put in action by pressing a single button.

The delivery outlook for battery purchasers is good. Because about half of industrial batteries are made to special specifications, there is very little off-the-shelf supply available. But, if you are interested in a standard item, you can get delivery within one week.

If you are looking for something to fit exact requirements, you'll wait 3 to 4 weeks, depending on the special engineering required, and the size of your order.

Price Picture Favorable—But battery makers say you had better consider carefully, and be sure of what you want.

Pricewise, the battery market favors buyers. The main items in the cost of batteries are labor and lead. The lead price is down from a few months ago, and now looks fairly stable. Labor costs have not increased enough to plough under this advantage.



INDUSTRIAL CHECKOUT: Battery charging equipment on electric truck which assists in ash removal from soaking pits at Allegheny Ludlum Steel Corp.'s Brackenridge Works is given a test by company employee.



Bucyrus-Erie Cranes Offer Money-Saving Features

Bucyrus-Erie rugged-duty 38-B cranes offer features that mean savings on heavy material handling, plant construction, and maintenance assignments.

Strong, light crane booms are of lattice-type construction, with angle members welded to the inside of chord legs so there are no obstructions on the outside of booms. Inside lacing eliminates secondary stresses. Independent power controlled lowering boom hoist enables the operator to change boom angle at any point in the cycle . . . permits accurate positioning of loads.

For special crane applications, these machines are available with a third drum assembly, particularly useful for pile driving work. When used in conjunction with independent propel, the third drum has power controlled lowering on its hoist line. A variety of boom lengths and jib extensions enable the 38-B to meet all job requirements.

Other crawler cranes and 15-, 25- and 35-ton Transit Cranes are also available. See your nearby Bucyrus-Erie distributor soon for more details about the size that fits your needs.

367E57



BONUS QUALITY saves you money . . . Carefully measured alloys are added to an 8-ton charge in this electric furnace, where some of Bucyrus-Erie's prime steels are produced. Company foundries use both electric and open hearth furnaces to provide the high-strength, long-wearing steels that mean better service in every Bucyrus-Erie.

A Familiar Sign . . . **BUCYRUS-ERIE** *..at Scenes of Progress*

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

Flat-Rolled Pickup Builds Steam

October tonnage requests slightly disappointed some sheet and strip mills.

But signs grow that the buyers are finally beginning to get order-minded.

The flat-rolled improvement, while still not in high gear, shows signs of picking up speed.

Buyers not heard from since June are calling their mills. Steel purchasers are doing less cancelling and deferring of orders. And they are showing more concern about getting tonnages on the books.

Although it still doesn't happen frequently, buyers are discovering they can't always get included in the next rolling of the product they want. So they do the next best thing and sign up right away for the following rolling.

Still Marking Time — However, many mills are still having trouble completely filling October books on sheet and strip. They continue taking light plate orders to fill out schedules. Often they prefer small tonnage light plate orders which can be gotten out quickly, rather than larger ones which might tie up sheet and strip facilities at the wrong time.

The big push in sheet and strip orders from Detroit, still not present, is expected to also pump some life into such products as carbon bar and wire and stainless steel. At the moment the automakers are ordering only 35 days ahead.

Sheet and Strip—October will be a better month than September for the mills but the big push from automotive buyers has not yet been felt. Automotive companies are

still ordering only about 35 days ahead and final November orders have not yet been received. Appliance orders are also lagging. **Detroit** mills report the slump in appliance buying has helped make it easier for the auto companies to enter orders and get deliveries in a short time. **Pittsburgh** producers can still offer 3-week delivery on cold-rolled sheet. Deliveries are a little longer at **Chicago** at 5-7 weeks. Most new ordering is conservative based on actual consumer needs. **Eastern** mills indicate some customers not able to get product on the next scheduled rolling are quickly signing up for the one following. It's a minor trend at the moment. **West Coast** warehouses expect overloaded stocks of hot and cold-rolled sheet and strip will begin to move soon.

Bar—No automotive pickup has come to the rescue of the market as yet. A slight spurt in automotive buying as reported by **Pittsburgh** area mills has not been enough to offset the general market weakness there. **Eastern** suppliers say there's little forward buying, with most requests from customers being strictly to fill inventories. **Chicago**

cold-finishers, believing customer inventories to be very low, are wondering why the pickup in cold-rolled sheet hasn't spread over into bar. They look for the expected improvement to hit hard and suddenly.

Stainless—Market remains weak although there are a few more encouraging signs. Automotive sheet and strip sales have improved and stainless plates are in good demand. **Detroit** area mills indicate sheet and strip orders have increased from the auto firms. Quite a few of these are rush orders with buyers wanting delivery in 1-4 weeks instead of the usual 4-6 weeks. Warehouses in the **Chicago** district also report they are doing a good business in stainless.

Warehouses—Sales level for the distributors is generally upward. A lot depends on the amount of cold-rolled sheet the individual warehouse has in stock. Those with a 6-month supply or more are not optimistic. Others with stocks of 4-5 months see things as improved. Generally sales for September are reflecting a 5-10 pct gain over August levels on a tonnage basis. Some outlets have gotten hold of previously scarce wide flange structurals and feel better about their stocks of this grade. However, the suppliers are continuing to build up stocks of light plate.

Pipe and Tubing — Both **East Coast** and **Pittsburgh** mills say oil country demand is off but they expect to continue capacity operations in the fourth quarter. Mill stocks of butt-weld pipe are large with customers demand for the product still poor. Seamless pipe deliveries in the **East** are from 1 to 5 weeks depending on whether the product is in mill stocks or requires processing. **Cleveland** producers say oil country cancellations of seamless tubing are still in the spotty category but small tonnages freed by them are available for fourth quarter delivery. Large diameter welded pipe is being quoted for 1959 and 1960.

PURCHASING AGENTS' CHECKLIST

A sound approach to cost cutting should begin right at the raw materials stage. **P. 103**

Missile emphasis will keep electronics firms busy. **P. 123**

Combining several techniques may solve castings problems. **P. 145**

COMPARISON OF PRICES

(Effective Sept. 17, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Sept. 17 1957	Sept. 10 1957	Aug. 20 1957	Sept. 18 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.925¢	4.675¢
Cold-rolled sheets	6.05	6.05	6.05	5.75
Galvanized sheets (10 ga.)	6.60	6.60	6.60	6.30
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold-rolled strip	7.17	7.17	7.17	6.870
Plate	5.12	5.12	5.12	4.87
Plates, wrought iron	13.15	13.15	13.15	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	47.50

Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	\$10.30	\$10.30	\$10.30	\$9.85
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.55
Special coated mfg. ternes	9.55	9.55	9.55	9.10

Bars and Shapes: (per pound)				
Merchant bar	5.425¢	5.425¢	5.425¢	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6.475	6.475	6.125
Structural shapes	5.275	5.275	5.275	5.00
Stainless bars (No. 302)	45.00	45.00	45.00	40.75
Wrought iron bars	14.45	14.45	14.45	11.50

Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.65¢	7.20¢

Rails: (per 100 lb.)				
Heavy rails	\$5.525	\$5.525	\$5.525	\$5.075
Light rails	6.50	6.50	6.50	6.00

Semi-finished Steel: (per net ton)				
Re-rolling billets	\$77.50	\$77.50	\$77.50	\$74.00
Slabs, re-rolling	77.50	77.50	77.50	74.00
Forging, billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00

Wire Rod and Skelp: (per pound)				
Wire rods	6.15¢	6.15¢	6.15¢	5.80¢
Skelp	4.875	4.875	4.875	4.225

Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.967¢	5.622¢

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	Sept. 17 1957	Sept. 10 1957	Aug. 20 1957	Sept. 18 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	70.51	\$70.51	\$70.38	\$67.76
Foundry, Valley	66.50	66.50	66.50	63.00
Foundry, Southern Cin'ti	71.65	71.65	70.67	67.17
Foundry, Birmingham	62.50	62.50	62.50	59.00
Foundry, Chicago	66.50	66.50	66.50	63.00
Basic, del'd Philadelphia	70.01	70.01	69.88	66.84
Basic, Valley furnace	66.00	66.00	66.00	63.00
Malleable, Chicago	66.50	66.50	66.50	63.00
Malleable, Valley	66.50	66.50	66.50	63.00
Ferromanganese,				
cents per lb	12.75¢	12.75¢	12.75¢	11.75¢
74 to 76 pct Mn base.				

Pig Iron Composite: (per gross ton)				
Pig iron	\$66.42	\$66.42	\$66.40	\$63.04

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	\$48.50	\$50.50	\$55.50	\$58.50
No. 1 steel, Phila. area	45.00	47.50	51.50	58.50
No. 1 steel, Chicago	46.50	47.50	52.00	59.50
No. 1 bundles, Detroit	43.50	44.50	50.50	56.50
Low phos., Youngstown	53.50	54.50	57.50	65.50
No. 1 mach'y cast, Pittsburgh	57.50	58.50	58.50	60.50
No. 1 mach'y cast, Philadel'a	56.50	56.50	56.50	58.00
No. 1 mach'y cast, Chicago	48.50	49.50	53.50	60.00

Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	\$46.67	\$48.50	\$53.00	\$58.83

Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	\$15.38	\$15.38	\$15.38	\$14.50
Foundry coke, prompt	\$17.50-\$19	\$17.50-\$19	\$17.50-\$19	\$17.50

Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	27.00	27.00	28.50	40.00
Copper, Lake, Conn.	27.00	27.00	28.50	40.00
Tin, Straits, N. Y.	93.75*	93.25*	94.50	106.00
Zinc, East St. Louis	10.00	10.00	10.00	13.50
Lead, St. Louis	13.80	13.80	13.80	15.80
Aluminum, virgin ingot	28.10	28.10	28.10	27.10
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

← To identify producers see Key on p. 204 →

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. B6	68.00	68.50	69.00	69.50	
Birmingham R1	62.00	62.50*			
Birmingham W9	62.00	62.50*	66.50		
Birmingham U4	62.00	62.50*	66.50		
Buffalo R1	66.00	66.50	67.00	67.50	
Buffalo H1	66.00	66.50	67.00	67.50	
Buffalo W6	66.00	66.50	67.00	67.50	
Chester P2	66.50	67.00	67.50		
Chicago I4	66.00	66.50	66.50	67.00	
Cleveland A5	66.00	66.50	66.50	67.00	71.00†
Cleveland R3	66.00	66.50	66.50	67.00	
Duluth I4	66.00	66.50	66.50	67.00	71.00†
Erie I4	66.00	66.50	66.50	67.00	71.00†
Everett M6	66.50	67.00	67.50		
Fontana K1	75.00	75.50			
Geneva, Utah C7	66.00	66.50			
Granite City G2	67.30	68.40	68.90		
Hubbard Y1			66.50		
Ironton, Utah C7	66.00	66.50			
Midland C11	66.00				
Minnequa C6	68.00	68.50	69.00		
Monessen P6	66.00				
Neville Is. P4	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda T1	66.00	66.50	67.00	67.50	
Sharpsville S3	66.00	66.50	66.50	67.00	
So. Chicago R3	66.00	66.50	66.50	67.00	
So. Chicago W8	66.00	66.50	66.50	67.00	
Swedeland A2	68.00	68.50	69.00	69.50	
Talco I4	66.00	66.50	66.50	67.00	
Troy, N. Y. R3	68.00	68.50	69.00	69.50	74.00
Youngstown Y1			66.50	67.00	

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, 32¢ per ton for 0.50 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Add \$1.00 for 0.31-0.60 pct phos.

Silvery Iron: Buffalo (6 pct), H1, \$79.25; Jackson J1, I4 (Globe Div.), \$78.00; Niagara Falls (15.01-15.50), \$101.00; Kokuk (14.01-14.50), \$103.50; (15.51-16.00), \$106.50. Add \$1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add \$1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): \$64.00. Add \$1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingot, re-rol.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.50	37.25	38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	50.00	50.75	76.75	59.75	69.75	40.25	35.00	36.75	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Wire CP; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50-52.75	61.50	35.75	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2, J2; Baltimore, Md.; Middletown, O., A7; Massillon, O., R3; Gary, Ind.; Bridgeville, Pa., U2; New Castle, Ind., I2.

Strip: Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, Md.; Canton Massillon, O., R3; Harrison, N. J., D3; Youngstown, J3; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extra); W1; New Bedford, Mass. (.25¢ per lb higher), R6; Gary, Ind. (.25¢ per lb higher).

Bar: Baltimore, A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; S. Chicago, U1; Syracuse, N. Y., C11; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T3, R3; Ft. Wayne, Ind.; Detroit, R3; Gary, Ind.; Pittsburgh, B7.

Wire: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, Ind.; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, Pa.; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15; Vandergrift, Pa., U1; Gary, Ind.; Pittsburgh, B7.

Forging billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R3; Munhall, Pa., S. Chicago, U1; Pittsburgh, B7.

No Pause in Scrap Decline

Dealers find little to cheer about in current situation. Mills are threatening to stay out until next year.

Decline is general while scrap begins to pile up in dealer yards. Distress offers find no takers.

■ Pessimism verging on near panic among some dealers dominates the scrap market.

Prices of most grades are down significantly in all market areas. Many declines are on market appraisal, with no sales made to test the degree of weakness and none likely in the immediate future.

A major consumer has let out the word it will not be in the market for some time. This is interpreted conservatively that unless the steel operating rate increases, the consumer will not buy at present prices. Weakness is general, with no market showing any particular strength. As a result of general declines, The IRON AGE Composite Price dropped from \$48.50 to \$46.67.

Question is how far the decline will continue. Opinion is almost unanimous that the drop will extend further before a floor is established.

The recent declines caught much of the trade by surprise. Many had held on to supplies, confident of a sharp increase in steel operations in September, with a resulting increase in scrap prices. Those who did are now eyeing their stocks, and wondering where and when they will move.

Pittsburgh — Prices continue to slide. Openhearth grades are off \$2. Low phos, turnings, cast scrap and most railroads are down. There is not enough activity to test the market, but all signs point downward. Small tonnages of No. 2 bundles have been sold at \$40.

Chicago — The market slipped again as a major mill bought briefly at reduced prices and then cut purchases almost entirely. Purchases by smaller consumers confirmed the slide of virtually the entire scrap list. Rail grades were particularly hard hit. Unconfirmed reports that other large consumers would continue to hold off have depressed the market even further.

Philadelphia — Small tonnages of scrap moved at substantially lower prices this week. Steelmaking and turnings grades led the slide. With no mill buying spree in sight, general feeling is that further price drops will be coming.

New York — This market is very weak. Prices fell from \$2 to \$4 a ton down the line, based on sales. Biggest drop was in No. 1 heavy melting, down \$4 to \$43-\$44, and No. 2 bundles, down \$4 to \$31-\$32.

Detroit — Small sales of machine shop turnings and shoveling turnings just served to point up the softness of the market here. Both grades are off \$2. Dealers' yards are full and so are mills. There is very little activity in water shipment of scrap, and that is all for Canadian export. Some brokers

have scrap that hasn't a home piled on the waterfront.

Cleveland — Cleveland and Valley markets settled another \$1 on appraisal and railroad grades are down as much as \$3 on monthly lists. Dealers are making some distress offerings and still finding no takers. Railroad lists sold in the area for amounts down \$9 from a month ago. Decline is expected to continue still more before making a comeback.

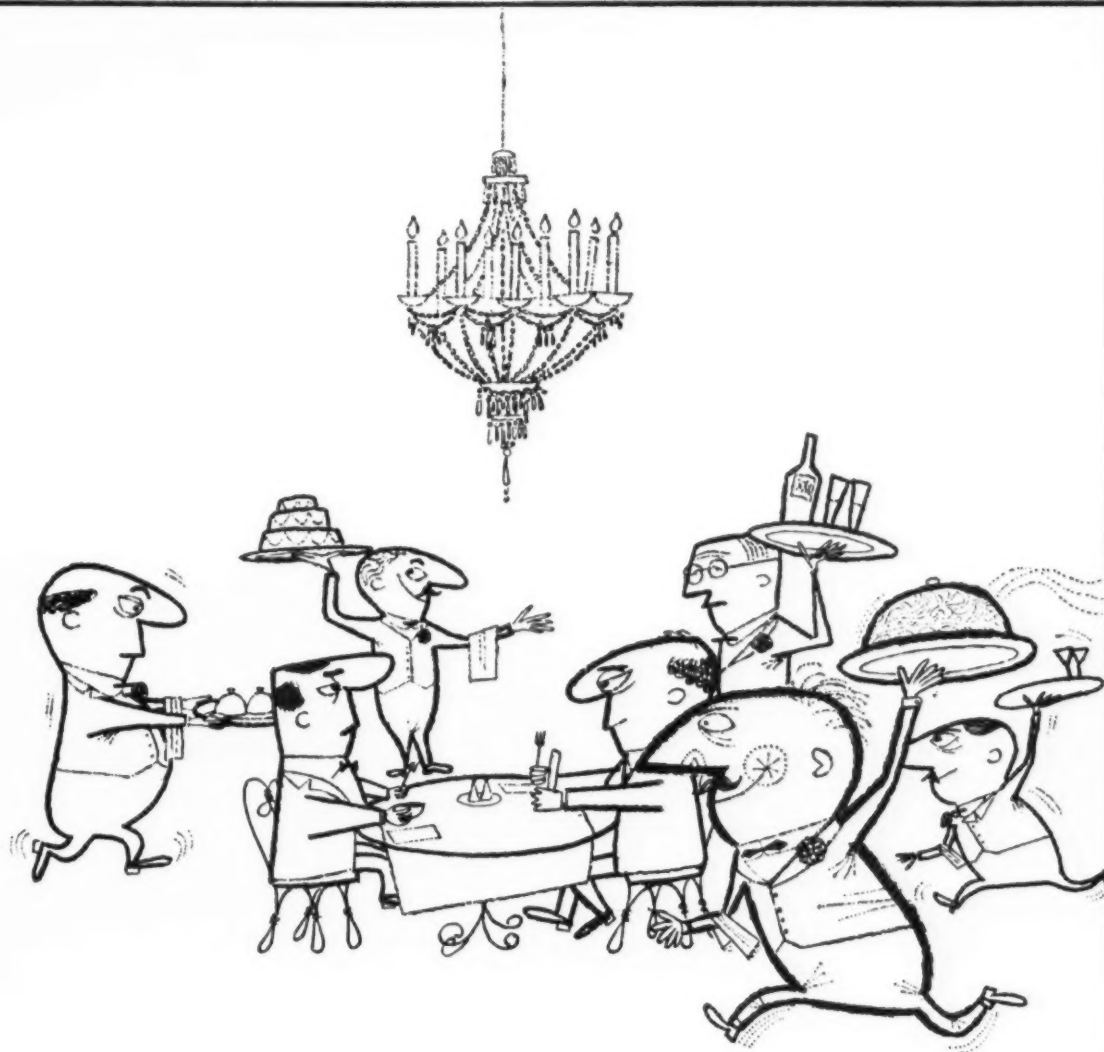
St. Louis — The flow of scrap to the steel mills is slightly above the melt. Results is a price reduction of \$1 on heavy melting steel. No. 1 railroad melting is off \$2 on a sale by a railroad and rerolling rails declined \$3.

Birmingham — The steel scrap market in this district is weaker than for months, with openhearth consumers out of the market and with the electric furnaces reducing prices. The cast market continues unchanged due to buying by two or three larger consumers, but brokers anticipate lower prices when their present needs are filled. Exporters at some ports are reported offering \$45 per ton FAS for No. 1 steel, \$40 for No. 2 and \$35 for No. 2 bundles.

Cincinnati — The market settled another \$1 on primary grades and even more on secondary and railroad grades. No. 2 bundles are a glut on the market and dropped \$4 on up-river sales to Pittsburgh on old orders. Dealer inventories are not high enough to indicate a panic in the making.

Buffalo — Machine shop turnings and cast prices are off in a generally weak market. There is almost no activity here and any new purchases are expected to be at lower prices.

Boston — The market is very weak, with no sales of any size in prospect. Both export and domestic markets are virtually dead. No. 1 grades are down \$1 on appraisal. Some turnings and cast grades are also off.



If you like
service . . .

THE LUNTZ IRON & STEEL COMPANY

OFFICES: Canton, Ohio; Cleveland, Ohio; Warren, Ohio; Kokomo, Indiana; Detroit, Michigan; Pittsburgh, Pa.

PLANTS: Canton, Ohio; Cleveland, Ohio; Warren, Ohio; Kokomo, Indiana.

SCRAP PRICES (Effective Sept. 17, 1957)

Pittsburgh

No. 1 hvy. melting	\$48.00 to \$49.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 dealer bundles	48.00 to 49.00
No. 1 factory bundles	56.00 to 57.00
No. 2 bundles	39.00 to 40.00
No. 1 busheling	48.00 to 49.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Low phos. punch's plate	56.00 to 57.00
Heavy turnings	43.00 to 44.00
No. 1 RR hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	66.00 to 67.00
Rails 2 ft and under	73.00 to 74.00
RR steel wheels	65.00 to 66.00
RR spring steel	65.00 to 66.00
RR couplers and knuckles	65.00 to 66.00
No. 1 machinery cast.	57.00 to 58.00
Cupola cast.	47.00 to 48.00
Heavy breakable cast.	45.00 to 46.00

Chicago

No. 1 hvy. melting	\$46.00 to \$47.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 dealer bundles	47.00 to 48.00
No. 1 factory bundles	52.00 to 53.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. forge crops	57.00 to 58.00
Low phos. punch's plate	53.00 to 54.00
Low phos. 3 ft and under	52.00 to 53.00
No. 1 RR hvy. melting	52.00 to 53.00
Scrap rails, random lgth.	60.00 to 61.00
Rolling rails	64.00 to 65.00
Rails 2 ft and under	62.00 to 63.00
Locomotive tires cut	57.00 to 58.00
Cut bolsters & side frames	58.00 to 59.00
Angles and splice bars	61.00 to 62.00
RR steel car axles	67.00 to 68.00
RR couplers and knuckles	57.00 to 58.00
No. 1 machinery cast.	48.00 to 49.00
Cupola cast.	43.00 to 44.00
Heavy breakable cast.	41.00 to 42.00
Cast iron brake shoe	43.00 to 44.00
Cast iron wheels	49.00 to 50.00
Malleable	56.00 to 57.00
Stove plate	41.00 to 42.00
Steel car wheels	56.00 to 58.00

Philadelphia Area

No. 1 hvy. melting	\$44.50 to \$45.50
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	45.50 to 46.50
No. 2 bundles	35.50 to 36.50
No. 1 busheling	45.50 to 46.50
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Shoveling turnings	30.00 to 31.00
Clean cast. chem. borings	40.00 to 41.00
Low phos. 5 ft and under	53.50 to 54.50
Low phos. 2 ft and under	54.50 to 55.50
Low phos. punch's plate	54.50 to 55.50
Elec. furnace bundles	49.00 to 50.00
Heavy turnings	46.50 to 47.50
RR steel wheels	62.50 to 63.50
RR spring steel	62.50 to 63.50
Rails 18 in. and under	70.00 to 71.00
Cupola cast	43.00 to 44.00
Heavy breakable cast.	49.50 to 50.50
Cast iron car wheels	56.00 to 57.00
Malleable	60.00 to 61.00
Unstripped motor blocks	34.00 to 35.00
No. 1 machinery cast.	56.00 to 57.00

Cleveland

No. 1 hvy. melting	\$49.00 to \$50.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 dealer bundles	49.00 to 50.00
No. 1 factory bundles	54.00 to 55.00
No. 2 bundles	38.00 to 39.00
No. 1 busheling	49.00 to 50.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	25.00 to 26.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	25.00 to 26.00
Cut struc'l & plates, 2 ft & under	54.00 to 55.00
Drop forge flashings	49.00 to 50.00
Low phos. punch's plate	50.00 to 51.00
Poundry steel, 2 ft & under	50.00 to 51.00
No. 1 RR heavy melting	51.00 to 52.00
Rails 2 ft and under	70.00 to 71.00
Rails 18 in. and under	71.00 to 72.00
Railroad grate bars	29.00 to 30.00
Steel axle turnings	30.00 to 31.00
Railroad cast	53.00 to 54.00
No. 1 machinery cast.	53.00 to 54.00
Stove plate	47.00 to 48.00
Malleable	59.00 to 60.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$52.00 to \$53.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	52.00 to 53.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	53.00 to 54.00

Buffalo

No. 1 hvy. melting	\$47.00 to \$48.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 busheling	47.00 to 48.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	33.00 to 34.00
Machine shop turn.	25.00 to 26.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	32.50 to 33.50
Cast iron borings	31.00 to 32.00
Low phos. plate	51.00 to 52.00
Scrap rails, random lgth.	57.00 to 58.00
Rails 2 ft and under	67.00 to 68.00
RR steel wheels	54.00 to 55.00
RR spring steel	50.00 to 51.00
RR couplers and knuckles	50.00 to 51.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	46.00 to 47.00

Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$43.00 to \$44.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	43.00 to 44.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	42.00 to 43.00
Drop forge flashings	42.00 to 43.00
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. punch's plate	44.00 to 45.00
No. 1 cupola cast.	44.00 to 45.00
Heavy breakable cast.	40.00 to 41.00
Stove plate	40.00 to 41.00
Automotive cast.	50.00 to 51.00

St. Louis

No. 1 hvy. melting	\$42.00 to \$43.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	38.00 to 39.00
Machine shop turn.	28.00 to 29.00
Cast iron borings	30.00 to 31.00
Shoveling turnings	30.00 to 31.00
No. 1 RR heavy melting	52.00 to 53.00
Rails, random lengths	62.00 to 63.00
Rails 18 in. and under	69.00 to 70.00
Locomotive tires uncut	58.00 to 59.00
Angles and splice bars	60.00 to 61.00
Std. steel car axles	64.00 to 65.00
RR specialties	58.00 to 59.00
Cupola cast	48.00 to 49.00
Heavy breakable cast.	42.00 to 43.00
Cast iron brake shoes	43.00 to 44.00
Stove plate	43.00 to 44.00
Cast iron car wheels	51.00 to 52.00
Rolling rails	67.00 to 68.00
Unstripped motor blocks	43.00 to 44.00

Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$37.00 to \$38.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	37.00 to 38.00
Elec. furnace, 3 ft & under	44.00 to 45.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and short turn.	19.00 to 20.00
Shoveling turnings	21.00 to 22.00
Clean cast. chem. borings	28.00 to 29.00
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	33.00 to 34.00
Heavy breakable cast.	38.00 to 39.00
Stove plate	32.00 to 33.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$43.00 to \$44.00
No. 2 hvy. melting	35.00 to 36.00
No. 2 dealer bundles	35.00 to 36.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	34.00 to 35.00
No. 1 machinery cast.	43.00 to 44.00
Mixed yard cast.	38.00 to 39.00
Charging box cast.	42.00 to 43.00
Heavy breakable cast.	42.00 to 43.00
Unstripped motor blocks	33.00 to 34.00

Birmingham

No. 1 hvy. melting	\$46.00 to \$47.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	46.00 to 47.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	31.00 to 32.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	27.00 to 28.00
Electric furnace bundles	47.00 to 48.00
Elec. furnace, 3 ft & under	45.00 to 46.00
Bar crops and plate	52.00 to 53.00
Structural and plate, 2 ft.	51.00 to 52.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	53.00 to 54.00
Rails, 18 in. and under	59.00 to 60.00
Angles & splice bars	55.00 to 56.00
Rolling rails	62.00 to 63.00
No. 1 cupola cast.	54.00 to 55.00
Stove plate	54.00 to 55.00
Charging box cast.	37.00 to 38.00
Cast iron car wheels	46.00 to 47.00
Unstripped motor blocks	44.00 to 45.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$48.00 to \$49.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	26.00 to 27.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	26.00 to 27.00
Low phos. 18 in. and under	55.00 to 56.00
Rails, random lengths	62.00 to 63.00
Rails, 18 in. and under	69.00 to 70.00
No. 1 cupola cast.	39.00 to 40.00
Hvy. breakable cast.	42.00 to 43.00
Drop broken cast.	52.00 to 53.00

San Francisco

No. 1 hvy. melting	\$44.00
No. 2 hvy. melting	42.00
No. 1 dealer bundles	43.00
No. 2 bundles	35.00
Machine shop turn.	32.00
Cast iron borings	30.00 to 32.00
No. 1 RR hvy. melting	44.00
No. 1 cupola cast.	53.00 to 55.00

Los Angeles

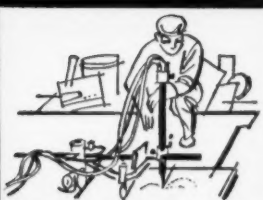
No. 1 hvy. melting	\$44.00
No. 2 hvy. melting	42.00
No. 1 dealer bundles	43.00
No. 2 bundles	35.00
Machine shop turn.	\$29.00 to 30.00
Shoveling turnings	32.00
Cast iron borings	32.00
Elec. furn. 1 ft and under (foundry)	55.00
No. 1 RR hvy. melting	44.00
No. 1 cupola cast.	49.00

Seattle

No. 1 hvy. melting	\$44.00
No. 2 hvy. melting	42.00
No. 2 bundles	33.00
No. 1 cupola cast.	46.00
Mixed yard cast.	46.00

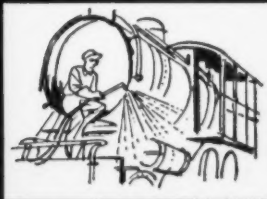
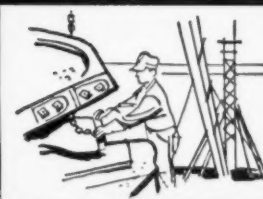
Hamilton, Ont.

No. 1 hvy. melting	\$47.00
No. 2 hvy. melting	42.00
No. 1 dealer bundles	47.00
No. 2 bundles	36.00
Mixed steel scrap	42.00
Busheling	36.00
Bush., new fact., prep'd	47.00
Bush., new fact., unprep'd	41.00
Machine shop turn.	22.00
Short steel turn.	30.00
Mixed bor. and turn.	24.00
Rails, rerolling	56.00
Cast scrap	52.00



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Copper Firming Up Surprises Trade

Note of panic replaced by cautious confidence as custom smelters bump price twice.

Report increased activity at the higher price.

Scrap, and brass and bronze ingot follow custom smelter copper up.

■ The copper market appears to have reversed itself in a hurry—to the surprise of almost everyone. The overtones of panic evident early in the week have given way to wary confidence.

The key move was the reversal of a five-month price downtrend by custom smelters, with two increases in two days. Custom smelters say they are now moving more copper at 26¢ per lb than they were at 25¢.

Scrap Up—The upturn in custom smelter copper price pulled brass and bronze ingot prices along with it—up 1¢ to 1½¢ per lb. And scrap dealers who had been holding back metal for a higher price (THE IRON AGE, Aug. 29, p. 119) got it as custom smelters offered 1¢ more for the bellwether grade, No. 2 copper.

Producers' copper is still 27¢ per lb. But, a spokesman for a major producer says it is a "much stronger 27¢" than it was a week ago.

The smoke from the custom smelters' double increase hasn't cleared yet, and no one is exactly sure what caused the sudden firming. But there are three ideas most frequently mentioned in the trade.

Why the Increase?—The vice president in charge of sales for a major brass mill says there is just not enough improvement in busi-

ness yet to explain the upturn. He feels the market just fell too fast, too far; is merely recovering to more reasonable levels. Several smaller brass mills also subscribe to this idea. And this is the explanation favored by Sir Ronald Prain, chairman, Rhodesian Selection Trust Group, for the sharp rise in the London Metals Exchange price, which preceded, and no doubt influenced the custom smelters' move.

A more optimistic group, including a major brass mill, point out they have been expecting a fairly solid last quarter. The firming is just a few weeks early, they say. They point to Copper Institute statistics which indicate the situation began to look up in August.

August Improved—According to the Copper Institute world refined production was down in August—232,169 tons from 239,176 tons in July. Deliveries to customers during last month were up—231,871 tons from 204,035 tons the previous month.

A few traders insist that custom smelters put the cart before the horse. They say the smelters knew their customers were operating on minimum inventories, waiting for the market to hit the floor before restocking. The double price increase was for the purpose of convincing consumers this had happened. These traders say the business done at the higher price is merely a flurry. They expect the market to hit another period of doldrums until fabricated products start moving—probably late in October.

These traders point out that sales levels are already beginning to settle down. The custom smelter

price still holds, but scrap prices are off a fraction of a cent.

Aluminum

General Services Administration has announced Aluminum Co. of America, and Kaiser Aluminum & Chemical Co. have agreed to deduct from what they can "put" with the government, an amount equal to all they import from Canada.

This will knock about 200,000 tons per year off the total aluminum the government must buy under contracts with the producers. It should be enough to take the strain off of a difficult situation. (THE IRON AGE, Aug. 8, p. 132.)

Reduce Extras—Reynolds Metals Co. reduced its special charges on extra-large sizes of non-heat-treatable alloy plate. Reduction will amount to about 4.9¢ per lb on plate and plate circles with width or diameter in excess of 84 in.

The producer said the reduction was made because of economies at the new wide plate production facilities at Listerhill, Ala., and McCook, Ill.

Tin prices for the week: Sept. 11—93.25; Sept. 12—93.25; Sept. 13—93.50; Sept. 16—93.75; Sept. 17—93.75*.

*Estimate.

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	28.10	27.10	8/1/87
Aluminum pig	26.00	25.00	8/1/87
Copper (E)	27.00	28.50	9/3/87
Copper (CS)	26.00	25.50	9/13/87
Copper (L)	27.00	28.50	9/3/87
Lead, St. L.	13.80	14.80	8/11/87
Lead, N. Y.	14.00	15.00	8/11/87
Magnesium ingot	36.00	34.09	8/13/86
Magnesium pig	35.25	33.75	8/13/86
Nickel	74.00	84.50	12/6/86
Titanium sponge	165.250	165.225	8/8/87
Zinc, E. St. L.	10.00	10.50	7/1/87
Zinc, N. Y.	10.50	11.00	7/1/87

ALUMINUM: 99% ingot frt allwd. **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig. Velasco, Tex. **NICKEL:** Port Colbourne, Canada. **ZINC:** prime western. **TIN:** see above; other primary prices, pg. 200.

Inland Ledloy*.the original leaded steels

It is not by chance that Inland Ledloy steels have set the standards with which all other free machining steels are compared. Almost twenty years have passed since Inland started a metal-working revolution with its discovery of how to add lead to steel—years in which Inland has refined and developed its techniques and gained the practical daily production experience that has made Inland world leader in the production of fine leaded steels.



This is a typical and frequent scene at Inland. Here, where leaded steels were first developed, come cold drawers, warehousemen, and users of Ledloy steels from many countries. The visitors, in this photograph, listening intently as an Inland production specialist explains a step in the making of Ledloy, come from Paris. They are Messieurs Gay and Coevoet of DAVUM, largest steel warehouse in France.

Following the war, as more and more people became acquainted with these fast-cutting steels, Ledloy rapidly gained in popularity and came into widespread use. Today Ledloy, originated and developed by Inland, is made overseas under license from Inland and used extensively in almost every nation in Europe and in countries the world over.

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Indianapolis, Detroit, New York • *registered trade name of Inland Steel Company,
pioneer in the development of leaded steels.

NONFERROUS PRICES (Effective Sept. 17, 1957)

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate
("F" temper except 6061-0)

Alloy	.032	.081	136- .249	250- 3
1100, 3003	46.6	44.3	43.6	42.7
6062	54.0	48.9	47.2	45.4
6061-0	51.4	47.0	45.2	45.1

Extruded Solid Shapes

Factor	6062 T-5	6062 T-6
6-8	45.0-46.8	60.4-64.1
12-14	45.7-47.2	61.3-65.8
24-26	49.0-49.5	72.1-76.8
36-38	58.0-58.6	96.2-99.8

Screw Machine Stock—2011-T-3

Size"	3/4	3/4-5/8	3/4-1	1 1/4-1 1/2
Price	63.0	62.5	61.0	58.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"	72	96	120	144
.019 gage	\$1 420	\$1 893	\$2 367	\$2 839
.024 gage	1 774	2 366	2 957	3 549

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type	Gage	250- 3 000	250- 2 000	188	.081	.032
AZ31B Stand, Grade		67.9	69.0	77.9	108.1	
AZ31B Spec.		93.3	95.7	108.7	171.3	
Tread Plate		70.6	71.7			
Tooling Plate		73.0				

Extruded Shapes

Factor	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	87		

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	49.13	46.36	49.32	
Brass, 70/30	43.02	43.56	44.26	45.93
Brass, Low	45.50	46.04	45.44	48.31
Brass, R L	46.37	46.91	46.31	49.18
Brass, Naval	47.27	47.81	47.21	50.68
Muntz Metal	45.39	45.93	45.33	48.01
Comm. Br.	47.78	48.32	47.72	50.34
Mang. Br.	51.01	51.55	50.95	53.82
Phos. Br. 5%	68.07	68.57	68.07	70.57

Free Cutting Brass Rod 31.30

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$9.50-\$10.60; alloy, \$14.75; Plate, HR, commercially pure, \$8.00-\$8.75; alloy, \$10.75. Wire, rolled and/or drawn, commercially pure, \$7.50-\$8.00; alloy, \$10.00; Bar, HR or forged, commercially pure, \$6.15-\$6.40; alloy, \$6.15-\$6.35; billets, HR, commercially pure, \$6.00-\$6.25; alloy, \$6.00-\$6.20.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex.	33.50
Beryllium aluminum, 5% Be, Dollar	per lb contained Be \$74.75
Beryllium copper, per lb cont'd Be	\$43.00
Beryllium 97% lump or beads,	
f.o.b. Cleveland, Reading	\$71.50
Bismuth, ton lots	\$ 2.25
Cadmium, del'd	\$ 1.70
Calcium, 99.9%, small lots	\$ 4.65
Chromium, 99.8% metallic basis	\$ 1.31
Cobalt, 97-99% (per lb)	\$2.00 to \$2.07
Germanium, per gm, f.o.b. Miami,	
Okla., refined	\$39.50-53.56
Gold, U. S. Treas., per troy oz.	\$35.00
Indium, 99.9%, dollars per troy oz.	\$ 2.55
Iridium, dollars per troy oz.	\$86 to \$89
Lithium, 98%	\$11.00 to \$14.00
Magnesium, sticks, 100 to 500 lb.	59.00
Mercury, dollars per 76-lb flask,	
f.o.b. New York	\$246 to \$250
Nickel oxide sinter at Copper	
Cliff, Ont., contained nickel	71.25
Palladium, dollars per troy oz.	\$23 to \$24
Platinum, dollars per troy oz.	\$82 to \$87
Rhodium, \$120.00 to \$125.00	
Silver ingots (¢ per troy oz.)	90.160
Thorium, per kg.	\$43.00
Uranium, normal per kg.	\$40.00
Vanadium	\$ 3.45
Zirconium sponge	\$10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	27.75
No. 115	26.75
No. 120	26.75
No. 123	25.25
80-10-10 ingot	31.75
No. 305	29.75
No. 315	29.75
88-10-2 ingot	39.25
No. 210	35.00
No. 215	35.00
No. 245	31.25
Yellow ingot	22.50
No. 405	22.50
Manganese bronze	25.50
No. 421	25.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	25.75-26.50
0.30 copper max.	25.75-26.50
0.60 copper max.	25.75-26.50
Piston alloys (No. 122 type)	23.25-25.00
No. 12 alum. (No. 2 grade)	22.25-23.00
108 alloy	22.75-23.50
195 alloy	25.25-26.75
13 alloy (0.60 copper max.)	25.50-26.00
AXS-679	22.75-23.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97 1/2%	24.00-25.50
Grade 2—92-95%	22.00-22.50
Grade 3—90-92%	21.00-21.50
Grade 4—85-90%	19.25-20.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	23	22 1/4
Yellow brass	17 1/2	15 1/2
Red brass	20 1/2	19 1/2
Comm. bronze	21	20 1/2
Mang. bronze	16 1/2	15 1/2
Yellow brass rod ends	17 1/2	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	21
No. 2 copper wire	19 1/2
Light copper	17 1/2
*Refinery brass	18 1/2
Copper bearing material	17 1/2
*Dry copper content.	

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	21
No. 2 copper wire	19 1/2
Light copper	17 1/2
No. 1 composition	19 1/2
No. 1 comp. turnings	18 1/2
Heavy yellow brass solids	14
Brass pipe	17 1/2
Radiators	11 1/2

Aluminum

Mixed old cast.	14 — 14 1/2
Mixed new clips	16 1/2 — 17
Mixed turnings, dry	14 1/2 — 15 1/2

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 copper wire	17 1/2 — 18
No. 2 copper wire	15 1/2 — 16
Light copper	14 — 14 1/2
Auto radiators (unsweated)	12 1/2 — 12 1/2
No. 1 composition	16 — 16 1/2
No. 1 composition turnings	15 1/2 — 16
Cocks and faucets	12 1/2 — 13
Clean heavy yellow brass	11 1/2 — 12
Brass pipe	13 — 13 1/2
New soft brass clippings	13 1/2 — 14
No. 1 brass rod turnings	11 1/2 — 12 1/2

Aluminum

Alum. pistons and struts	5 1/2 — 6
Aluminum crankcases	11 — 11 1/2
1100 (2S) aluminum clippings	14 — 14 1/2
Old sheet and utensils	11 — 11 1/2
Borings and turnings	7 — 7 1/2
Industrial castings	11 — 11 1/2
2024 (24S) Clippings	12 1/2 — 13

Zinc

New zinc clippings	4 — 4 1/2
Old zinc	3 — 3 1/2
Zinc routings	1 1/2 — 2
Old die cast scrap	1 1/2 — 1 1/2

Nickel and Monel

Pure nickel clippings	50-55
Clean nickel turnings	45-50
Nickel anodes	50-55
Nickel rod ends	50-55
New Monel clippings	37-40
Clean Monel turnings	25-30
Old sheet Monel	35-38
Nickel silver clippings, mixed	20
Nickel silver turnings, mixed	17

Lead

Soft scrap lead	9 1/2 — 10
Battery plates (dry)	4 1/4 — 4 1/2
Batteries, acid free	2 1/4 — 3

Miscellaneous

Block tin	75 — 76
No. 1 pewter	59 — 60
Auto babbitt	39 — 40
Mixed common babbitt	11 — 11 1/2
Solder joints	15 1/2 — 16
Siphon tops	42
Small foundry type	13 — 13 1/2
Monotype	13 — 14 1/2
Lino. and stereotype	12 — 12 1/2
Electrotype	11 — 11 1/2
Hand picked type shells	8 — 8 1/2
Lino. and stereo. dross	3 1/2 — 4
Electro. dross	3 — 3 1/2

IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.												
STEEL PRICES (Effective Sept. 17, 1957)		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Re-rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide Flange	Hot rolled	Cold rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot rolled
EAST	Bethlehem, Pa.			\$114.00 B3		5.325 B3	7.80 B3	5.325 B3						
	Buffalo, N. Y.	\$77.50 R3, B3	\$96.00 R3, B3	\$114.00 R3, B3	6.225 B3	5.325 B3	7.80 B3	5.325 B3	4.925 R3, B3	7.15 S10	7.325 B3			
	Phila., Pa.									7.70 P15				
	Harrison, N. J.													15.05 C11
	Conschohocken, Pa.		\$101.00 A2	\$121.00 A2					4.975 A2	7.20 A2	7.325 A2			
	New Bedford, Mass.									7.60 R6				
	Johnstown, Pa.	\$77.50 B3	\$96.00 B3	\$114.00 B3		5.325 B3	7.80 B3							
	Boston, Mass.									7.70 T8				15.40 T8
	New Haven, Conn.									7.60 D1				
	Baltimore, Md.									7.15 T8				
	Phoenixville, Pa.					5.50 P2		5.50 P2						
	Sparrows Pt., Md.								4.925 B3		7.325 B3			
MIDDLE WEST	Bridgeport, Wallingford, Conn.	\$80.50 N8	\$101.00 N8	\$114.00 N8						7.60 W1				
	Pawtucket, R. I. Worcester, Mass.									7.70 N7 7.70 A5				15.40 N7 15.20 T8
	Alton, Ill.								5.125 L1					
	Ashland, Ky.								4.925 A7					
	Canton-Massillon, Dover, Ohio		\$96.00 R3	\$114.00 R3, T3						7.15 G4		10.45 G4		14.85 C11
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	\$77.50 U1, R3	\$96.00 U1, R3,W8	\$114.00 U1, R3,W8	6.225 U1	5.275 U1, W8,P13	7.75 U1, Y1 W8	5.275 U1	4.925 W8, N4, A1	7.25 A1, T8 M8			8.10 W8, S9, I3	15.05 A1, S9, G4
	Cleveland, Ohio									7.15 A5, J3		10.45 A5	8.10 J3	
	Detroit, Mich.			\$114.00 R3					5.025 G3, M2	7.25 M2, D1, D2, G3, P11	7.425 G3	10.60 D2 10.55 G3	8.10 G3	
	Anderson, Ind.									7.15 G4				
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	\$77.50 U1	\$96.00 U1	\$114.00 U1, Y1		5.275 U1, I3	7.75 U1, I3	5.525 I3	4.925 U1, I3, Y1	7.15 Y1	7.325 U1, I3, Y1	10.60 Y1	8.10 U1, Y1	
	Sterling, Ill.	\$77.50 N4				5.275 N4			5.025 N4					
WEST	Indianapolis, Ind.									7.30 J3				15.20 J3
	Newport, Ky.												8.10 A9	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		\$96.00 S1, C10	\$114.00 C10, S1					4.925 R3, S1	7.15 R3, T4 S1	7.325 R3, S1	10.50 S1 10.45 R3	8.10 S1	15.05 S1
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	\$77.50 U1, P6	\$96.00 U1, C11, P6	\$114.00 U1, C11, B7	6.225 U1	5.275 U1, J3	7.75 U1, J3	5.275 U1	4.925 P6	7.15 J3, B4, S7			8.10 S9	15.05 S9
	Weirton, Wheeling Follansbee, W. Va.					5.275 W3			4.925 W3	7.15 W3, F3	7.325 W3	10.50 W3		
	Youngstown, Ohio	\$77.50 R3	\$96.00 Y1, C10	\$114.00 Y1			7.75 Y1			7.15 Y1, J3	7.325 U1, Y1	10.65 Y1	8.10 U1, Y1	15.05 J3 10.65 Y1
	Fontana, Cal.	\$88.00 K1	\$105.50 K1	\$135.00 K1		6.075 K1	8.55 K1	6.225 K1	5.825 K1	9.00 K1				
	Geneva, Utah		\$96.00 C7			5.275 C7	7.75 C7							
	Kansas City, Mo.					5.375 S2	7.85 S2						8.35 S2	
	Los Angeles, Torrance, Cal.		\$105.50 B2	\$134.00 B2		5.975 C7, B2	8.45 B2		5.675 C7, B2	9.05 J3			9.30 B2	17.25 J3
	SOUTH	Minnequa, Colo.					5.575 C6			6.025 C6	9.10 K1			
Portland, Ore.						6.025 O2								
San Francisco, Niles, Pittsburg, Cal.			\$105.50 B2			5.925 B2	8.40 B2		5.675 C7, B2					
Seattle, Wash.			\$109.50 B2			6.025 B2	8.50 B2		5.925 B2					
Atlanta, Ga.						5.475 A8			5.125 A8					
Fairfield, Ala. City, Birmingham, Ala.		\$77.50 T2	\$96.00 T2			5.275 T2, R3, C16	7.75 T7		4.925 T2, R3, C16		7.325 T2			
Houston, Lone Star, Texas			\$101.00 S2	\$119.00 S2		5.375 S2	7.85 S2						8.35 S2	

IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL
PRICES(Effective
Sept. 17, 1957)

SHEETS

WIRE
ROD

TINPLATE†

BLACK
PLATE

	Hot rolled 18 ga. & hvyr.	Cold rolled	Galvanized	Enamel- ing	Long Tone	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.
EAST	Bethlehem, Pa.											
	Buffalo, N. Y.	4.925 B3	6.05 B3			7.275 B3	8.975 B3		6.15 W6			
	Claymont, Del.											
	Coatesville, Pa.											
	Conshohocken, Pa.	4.975 A2	6.10 A2			7.325 A2						
	Harrisburg, Pa.											
	Hartford, Conn.											
	Johnstown, Pa.								6.15 B3			
	Fairless, Pa.	4.975 U1	6.10 U1			7.325 U1	9.025 U1					
	New Haven, Conn.											
MIDDLE WEST	Phoenixville, Pa.											
	Sparrows Pt., Md.	4.925 B3	6.05 B3	6.60 B3		7.275 B3	8.975 B3	9.725 B3	6.25 B3	\$10.15 B3	\$8.85 B3	
	Worcester, Mass.								6.45 A5			
	Trenton, N. J.											
	Alton, Ill.								6.35 L1			
	Ashland, Ky.	4.925 A7		6.60 A7	6.625 A7							
	Canton-Massillon, Dover, Ohio			6.60 R3, R1								
	Chicago, Joliet, Ill.	4.925 W8, A1				7.275 U1			6.15 A5, R3 W8, N4, K2			
	Sterling, Ill.								6.25 N4, K2			
	Cleveland, Ohio	4.925 R3, J3	6.05 R3, J3		6.625 R3	7.275 R3, J3	8.975 R3, J3		6.15 A5			
WEST	Detroit, Mich.	5.025 G3, M2	6.15 G3, 6.05 M2			7.375 G3	9.075 G3					
	Newport, Ky.	4.925 A1	6.05 A1									
	Gary, Ind. Harbor, Indiana	4.925 U1, I3, Y1	6.05 U1, I3, Y1	6.60 U1, I3	6.625 U1, I3, Y1	7.00 U1	7.275 U1, Y1, I3	8.975 U1, Y1	6.15 Y1	\$10.05 U1, Y1	\$8.75 I3, U1, Y1	7.50 U1, Y1
	Granite City, Ill.	5.125 G2	6.25 G2	6.80 G2	6.825 G2						\$8.85 G2	7.60 G2
	Kokomo, Ind.			6.70 C9					6.25 C9			
	Mansfield, Ohio		6.05 E2			7.00 E2						
	Middletown, Ohio		6.05 A7	6.60 A7	6.625 A7	7.00 A7						
	Niles, Warren, Ohio Sharon, Pa.	4.925 R3, N3, S1	6.05 R3	6.60 R3	6.625 N3, S1	7.00 N3, S1, R3	7.275 R3	8.975 S1, R3			\$8.75 R3	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 U1, J3, P6	6.05 U1, J3, P6	6.60 U1, J3	6.625 U1	7.275 U1, J3	8.975 U1, J3	9.725 U1	6.15 A5, J3, P6	\$10.05 U1, J3	\$8.75 U1, J3	7.50 U1, J3
	Portsmouth, Ohio	4.925 P7	6.05 P7						6.15 P7			
SOUTH	Weirton, Wheeling, Follansbee, W. Va.	4.925 W3, W5	6.05 W3, F3, W5	6.60 W3, W5		7.00 W3, W5	7.275 W3	8.975 W3		\$10.05 W3, W5	\$8.75 W3, W5	7.50 W3
	Youngstown, Ohio	4.925 U1, Y1	6.05 Y1		6.625 Y1	7.275 Y1	8.975 Y1		6.15 Y1			
	Fontana, Cal.	5.825 K1	7.30 K1			8.175 K1	10.275 K1			\$10.80 K1	\$9.50 K1	
	Geneva, Utah	5.025 C7										
	Kansas City, Mo.								6.40 S2			
	Los Angeles, Torrance, Cal.								6.95 B2			
	Minneapolis, Colo.								6.40 C6			
	San Francisco, Niles, Pittsburg, Cal.	5.625 C7	7.00 C7	7.35 C7					6.95 C7	\$10.80 C7	\$9.50 C7	
	Seattle, Wash.											
	Atlanta, Ga.											
SOUTH	Fairfield, Ala. Alabama City, Ala.	4.925 T2, R1	6.05 T2, R1	6.60 T2, R1					6.15 T2, R3	\$10.15 T2	\$8.85 T2	
	Houston, Tex.								6.40 S2			

† Special coated mfg.
terne deduct 50¢ from
1.25-lb. coke base box
price. Can-making quality
blackplate 55 to 128 lb.
deduct \$2.20 from 1.25 lb.
coke base box.
* COKES: 1.50-lb.
add 25¢.
ELECTRO: 0.50-lb. add
25¢; 0.75-lb. add 65¢;
1.00-lb. add \$1.00. Differ-
ential 1.00 lb. 0.25 lb.
add 65¢.

IRON AGE

STEEL
PRICES(Effective
Sept. 17, 1957)

Italics identify producers listed in key at end of table. Base prices, f.a.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL PRICES <i>(Effective Sept. 17, 1957)</i>		BARS					PLATES				WIRE	
		Carbon† Steel	Reinforc- ing	Cold Finished	Alloy Hot rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr.'s. Bright
EAST	Bethlehem, Pa.				6.475 B3	8.775 B3	7.925 B3					
	Buffalo, N. Y.	5.425 R3,B3	5.425 R3,B3	7.35 B5	6.475 B3,R3	8.775 B3,B5	7.925 B3	5.10 B3		7.20 B2	7.625 R2	7.65 W6
	Claymont, Del.							5.70 P2		7.20 C4	7.625 C4	
	Coteseville, Pa.							5.50 L4		7.20 L4	7.925 L4	
	Conschocken, Pa.							5.20 A2	6.175 A2	7.20 A2	7.625 A2	
	Harrisburg, Pa.							5.80 P2	6.275 P2			
	Milton, Pa.	5.575 M7	5.575 M7									
	Hartford, Conn.			7.80 R3		9.075 R3	7.925 B3					
	Johnstown, Pa.	5.425 B3	5.425 B3		6.475 B3		5.10 B3		7.20 B3	7.625 B3	7.65 B3	
	Fairless, Pa.	5.575 U1	5.575 U1		6.625 U1							
	Newark, N. J.			7.75 W10		8.95 W10						
	Camden, N. J.			7.75 P10		8.95 P10						
	Bridgeport, Conn.	5.65 N8	5.65 N8	7.65 N8	6.55 N8	8.925 N8						
	Putnam, Conn.			7.85 W10								
	Willimantic, Conn.			7.80 J3								
MIDDLE WEST	Sparrows Pt., Md.		5.425 B3					5.10 B3		7.20 B3	7.625 B3	7.75 B3
	Palmer, Worcester, Readville, Mass.			7.85 B5,C14		9.075 A5,B5						7.95 A5, W6
	Mansfield, Mass.											
	Spring City, Pa.			7.75 K4		8.95 K4						
	Alton, Ill.	5.625 L1										7.85 L1
	Ashland,Newport,Ky.							5.10 A7,A1		7.20 A1		
	Canton, Massillon, Ohio			7.30 R3,R2	6.475 R5,T5	8.775 R3,R2, T5						
	Chicago, Joliet, Waukegan, Ill.	5.425 U1,R3, W8,N4,P13	5.425 U1,R3, N4,P13	7.30 A5, W10,W8, B5,L2,N9	6.475 U1,R3, W8	8.775 A5, W10,W8, L2,N9,B5	7.925 U1, W8	5.10 U1,A1, W8,I3	6.175 U1	7.20 U1,W8	7.625 U1,W8	7.65 A5, R3, W8,N4, K2,W7
	Harvey, Ill.											
	Cleveland, Ohio	5.425 R3	5.425 R3	7.30 A5,C13		8.775 A5, C13	7.925 R3	5.20 R3,J3	6.175 J3		7.625 R3, J3	7.65 A5, C13
	Detroit, Mich.	5.525 G3	5.775 G3	7.30 J3, 7.50 P8,B5	6.475 J3, 6.575 G3	8.775 R3, 8.975 B5,P3, P8	8.025 G3	5.20 G3		7.35 G3		
	Duluth, Minn.											7.65 A5
	Gary, Ind. Harbor, Crawfordville, Hammond, Ind.	5.425 U1,I3, Y1	5.425 U1,I3, Y1	7.30 R3,J3	6.475 U1,I3, Y1	8.775 R3,M4	7.925 U1, Y1	5.10 U1,I3, Y1	6.175 J3,I3	7.20 U1,Y1	7.625 U1, Y1,I3	7.75 M4
	Granite City, Ill.							5.30 G2				
	Kokomo, Ind.											7.75 C9
WEST	Sterling, Ill.	5.525 N4	5.525 N4					5.10 N4				7.75 K2
	Niles, Warren, Ohio Sharon, Pa.			7.30 C10	6.475 C10,S1	8.775 C10	7.925 S1	5.10 R3,S1		7.20 S1	7.625 R3, S1	
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.425 U1,J3	5.425 U1,J3	7.30 A5,B4, R3,J3,C11, W10,S9,C8	6.475 U1,J3, C11,B7	8.775 A5, W10,R3,S9, C11,C8	7.925 U1,J3	5.10 U1,J3	6.175 U1	7.20 U1,J3 B7	7.625 U1,J3 B7	7.65 A5, J3,P6
	Portsmouth, Ohio											7.65 P7
	Weirton, Wheeling, Follansbee, W. Va.							5.10 W5				
	Youngstown, Ohio	5.425 U1,R3, Y1	5.425 U1,R3, Y1	7.30 A5,Y1, F2	6.475 U1,Y1	8.775 Y1,F2	7.925 U1,Y1	5.10 U1,R3, Y1		7.20 Y1	7.625 U1, R3,Y1	7.65 Y1
	Emeryville, Cal.	6.175 J5	6.175 J5									
	Fontana, Cal.	6.125 K1	6.125 K1		7.525 K1		8.625 K1	5.90 K1		8.00 K1	8.425 K1	
	Geneva, Utah							5.10 C7			7.625 C7	
	Kansas City, Mo.	5.675 S2	5.675 S2		6.725 S2		8.175 S2					7.90 S2
	Los Angeles, Torrance, Cal.	6.125 C7,B2	6.125 C7,B2	8.75 R3,P14	7.525 B2	10.65 P14	8.625 B2					8.60 B2
	Minnequa, Colo.	5.875 C6	5.875 C6					5.95 C6				7.90 C6
	Portland, Ore.	6.175 O2	6.175 O2									
	San Francisco, Niles, Pittsburg, Cal.	6.125 C7, 6.175 B2	6.125 C7, 6.175 B2				8.675 B7					8.60 C7,C6
	Seattle, Wash.	6.175 B2,N6	6.175 B2				8.675 B2	6.00 B2		8.10 B2	8.525 B2	
SOUTH	Atlanta, Ga.	5.625 A8	5.625 A8									7.85 A8
	Fairfield, Ala. City, Birmingham, Ala.	5.425 T2,R3, C16	5.425 T2,R3, C16, S11	7.90 C16			7.925 T2	5.10 T2,R3			7.625 T2	7.65 T2,R3
	Houston, Ft. Worth, Lone Star, Tex.	5.675 S2	5.675 S2		6.725 S2		8.175 S2	5.20 S2, 5.45 L3		7.30 S2	7.725 S2	7.90 S2

† Merchant Quality—Special Quality 35¢ higher.

THE IRON AGE, September 19, 1957

STEEL PRICES (Effective Sept. 17, 1957)

Key to Steel Producers

With Principal Offices

- A1 Arco Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Arco-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Bardonia, Pa.
B7 A. M. Byers, Pittsburgh
C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Colorado Fuel & Iron Corp., Denver
C6 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shifting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shifting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thornhale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

- G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessup Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

- K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

- M1 Mahoning Valley Steel Co., Niles, O.
M2 McNath Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

- O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

- P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit

- PR Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Producton Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon
R3 Republic Steel Corp., Cleveland
R4 Roebbing Sons Co., John A. Trenton, N. J.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

- S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham

- T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Co. & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

- U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

- W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

- Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pt) f.o.b. mills. Base price about \$200 per net ton.

STANDARD T & C.	BUTTWELD														SEAMLESS							
	1/2 in.		3/4 in.		1 in.		1 1/4 in.		1 1/2 in.		2 in.		2 1/2 in.		2 in.		2 1/2 in.		3 in.		3 1/2 in.	
	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.
Sparrows Pt. B1	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Youngstown R1	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fontana K1	+8.25	+23.5	+5.25	+19.5	+1.75	+15.00	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00								
Pittsburgh J1	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Alton, Ill. L1	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Sharon M1	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fauley N2	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Pittsburgh N1	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Wheeling W1	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Wheatland W4	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Youngstown Y1	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Indiana Harbor Y1	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.25	+0.75	14.25	+0.25	15.25	+1.00								
Lorain N2	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. B1	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Youngstown R1	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Fauley N2	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Fontana K1	+3.75		0.25			3.25		3.75		4.25		4.75		5.25								
Pittsburgh J1	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Alton, Ill. L1	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Sharon M1	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Pittsburgh N1	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Wheeling W1	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Wheatland W4	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Youngstown Y1	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Indiana Harbor Y1	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50								
Lorain N2	9.75	+4.0	13.75		16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50

Threads only, butt weld and seamless 2 1/4 pt. higher discount. Plain ends, butt weld and seamless, 3-in. and under, 5 1/2 pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt. e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 10¢ per lb.

(Effective Sept. 17, 1957)

To identify producers, see Key on preceding page

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	21.68	T-1
18	4	1	—	5	2.385	T-4
18	4	2	—	—	1.185	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2

High-carbon chromium... .83 D-3, D-5
 Oil hardened manganese... .45 O-2
 Special carbon... .41 W-1
 Extra carbon... .345 W-1
 Regular carbon... .29 W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (A3, J2, L4)			Sheet (J2)	
	10 pct	15 pct	20 pct	20 pct	
302					37.50
304	37.95	42.25	46.70		40.00
316	44.40	49.50	54.50		58.75
321	40.05	44.60	49.30		47.25
347	42.40	47.55	52.80		57.00
405	29.85	33.35	36.85		
410	29.55	33.10	36.70		
430	29.80	33.55	37.25		

CR Strip (S9) Copper, 10 pct, 2 sides, 40.25; 1 side, 33.95.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Length)*	Cold-Reduced (Coiled or Cut Length)	
		Semi-Processed	Fully Processed
Field		9.625	
Armature	11.10	10.85	11.35
Elect.	11.80	11.55	12.05
Hermetic		12.10	
Motor	12.90	12.65	13.15
Dynamo	13.95	13.70	14.20
Trans. 72	15.00	14.75	15.25
Trans. 65	15.55		
Grain Oriented			
Trans. 58	16.05	Trans. 80	19.20
Trans. 52	17.10	Trans. 73	19.70

Producing points: Beech Bottom (W3); Brackenridge (A3); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N3); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3); Zanesville, Butler (A7).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	\$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Col	Col	Col	Col	Col	e lb.	e lb.
Alabama City R3	173	187	212	193		8.65	9.20
Aliquippa f3***	173	190		190		8.65	9.325
Atlanta A8**	175		208	199		8.50	9.10
Bartonville K2**	175	192	178	214	198	8.75	9.425**
Buffalo W6						8.65	8.95*
Chicago X6***							
Cleveland A6						8.65	
Cleveland A5						8.75	9.425
Crawfords M4**	175	192	214	198		8.65	9.20
Donora, Pa. A5	173	187	212	193		8.65	9.20
Duluth A5	173	187	212	193		8.65	9.20
Fairfield, Ala. T2	173	187	212	193		8.65	9.20
Galveston D4	175	192	214	198		8.90	9.45
Houston S2	175	192	214	198		8.90	9.45
Jacksonville M4	184	197	219	203		9.00	9.675
Johnstown B3**	173	190	212	193		8.65	9.325**
Joliet, Ill. A5	173	187	212	193		8.65	9.20
Kokomo C9*	175	189*	214	195*		8.75	9.30*
L. Angeles B2***	178	192*	217	198*		9.60	10.275
Kansas City S2*	178	192*	217	198*		8.90	9.45*
Minneapolis C61	178	192*	217	198*		8.90	9.45*
Monacaen P6			193			8.65	9.20
Palmer, Mass. W6						8.95	9.50*
Pittsburg, Cal. C7	192	210	213			9.60	10.15
Rankin, Pa. A5	173	187	212	193		8.65	9.20
So. Chicago R3	173	187	212	193		8.65	9.20
S. San Fran. C61			236			9.60	10.15*
Minneapolis B3**	175		214	198		8.75	9.425
Struthers, O. Y1*						8.65	9.30
Worcester A5	179					8.95	9.50
Williamport S5							

* Zinc less than .10¢.

** 11-12¢ zinc.

*** 10¢ zinc.

† Plus zinc extras.

‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.25	0.41	0.61	0.81	1.06
	0.40	0.60	0.80	1.05	1.35
Baltimore, Md. T8	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W12	9.50	10.70	12.90	15.90	18.85
Boston T8	8.95	10.40	12.60	15.60	18.55
Buffalo, N. Y. R7	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. S9	8.95	10.40	12.60	15.60	18.55
Cleveland A3	8.95	10.40	12.60	15.60	18.55
Dearborn S1	9.05	10.50	12.70		
Detroit D1	9.05	10.50	12.70	15.70	
Detroit D2	9.05	10.50	12.70		
Dover, O. G4	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M8	9.05	10.40	12.60	15.60	18.55
Franklin Park, Ill. T8	9.05	10.25	12.45	15.45	18.40
Harrison, N. J. C11	9.10	10.55	12.60	15.60	18.55
Indianapolis J3	9.10	10.55	12.60	15.60	18.55
Los Angeles	11.15	12.60	14.80	17.80	
New Castle, Pa. B4	8.95	10.40	12.60	15.60	
New Haven, Conn. D1	9.40	10.70	12.90	15.90	
Pawtucket, R. I. N7	9.50	10.70	12.90	15.90	18.85
Pittsburgh S7	8.95	10.40	12.60	15.60	18.55
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. S1	8.95	10.40	12.60	15.60	18.55
Trenton R4	10.70	12.90	16.10	19.30	
Wallingford W1	9.40	10.70	12.90	15.90	18.75
Warren, Ohio T4	9.50	10.70	12.90	15.90	18.85
Worcester, Mass. A5	8.95	10.40	12.60	15.60	18.55
Youngstown J1	8.95	10.40	12.60	15.60	18.55

BOILER TUBES

\$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size		Seamless	
	OD-In.	B.W. Ga.	H.R.	C.D.
Babcock & Wilcox	2	13	36.34	42.56
	2 1/2	12	48.94	57.31
	3	12	56.51	66.18
	3 1/2	11	65.97	77.25
National Tube	2	13	36.34	42.56
	2 1/2	12	48.94	57.31
	3	12	56.51	66.18
	3 1/2	11	65.97	77.25
Pittsburgh Steel	2	13	36.34	42.56
	2 1/2	12	48.94	57.31
	3	12	56.51	66.18
	3 1/2	11	65.97	77.25

**WARE-
HOUSES**

Cities	City Delivery* Charge	Sheets			Strip	Plates & Shapes			Bars			Alloy Bars		
		Hot-Rolled (18 ga. & br.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††		Hot-Rolled	Standard Structural	Hot-Rolled merchant	Cold- Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4110 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4110 Annealed	
Atlanta		8.59	9.87	10.13	8.64	8.97	9.05	9.01	10.68					
Baltimore	\$.10	8.38	8.88	9.86	8.86	8.76	9.29	9.16	11.44*	16.18	15.18	19.73	18.98	
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57					
Boston	.10	9.48	10.54	11.55	9.52	9.82	9.73	9.53	12.93*	15.79	15.38	19.89	19.18	
Buffalo	.15	8.40	9.60	11.22	8.65	9.05	8.65	8.95	8.85	16.34	15.15	19.01	18.95	
Chicago	.15	8.35	9.60	10.15	8.38	8.71	8.79	8.75	8.95	15.80	14.65	19.35	18.40	
Cincinnati	.15	8.49	9.65	10.20	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96	18.91	
Cleveland	.15	8.33	9.60	10.10	8.48	8.94	9.16	8.84	10.95*	15.89	14.74	19.44	18.54	
Denver	.20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65				17.60	
Detroit	.15	8.58	9.85	10.50	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81	18.86	
Houston		8.45	9.75		8.60	9.05	9.10	9.05	11.10	16.20		19.30	19.05	
Kansas City	.20	8.52	9.72	10.07	8.60	8.83	8.87	9.22	9.42	15.32	14.77	18.72	18.42	
Los Angeles	.10	9.60	10.85	11.75	9.65	9.65	9.70	9.80	12.85	17.25	15.00	21.05	19.25	
Memphis	.15	8.02	9.22		8.12	8.35	8.39	8.25	9.85					
Milwaukee	.15	8.48	9.73	10.28	8.51	8.84	9.00	8.88	9.18	15.43	14.93	18.78	18.73	
New York	.10	8.97	10.23	10.66	9.42	9.53	9.45	9.67	12.27*	15.02	15.19	18.42	18.99	
Norfolk	.20	8.00			8.40	8.35	8.70	8.45	10.70					
Philadelphia	.10	8.10	9.00	9.97	8.79	8.87	8.60	8.75	11.61*	15.61	15.11	18.96	18.91	
Pittsburgh	.15	8.33	9.60	10.50	8.48	8.71	8.79	8.75	10.95*	15.80	14.80	19.35	18.60	
Portland		9.50	11.20	11.55	11.35	8.30†	9.65	9.65	14.65	18.50	16.10	20.75	20.25	
San Francisco	.10	9.45	10.85	11.10	11.05	9.70	9.60	9.80	13.10	17.05	16.10	21.05	20.35	
Seattle		9.95	11.15	12.00	10.00	9.70	9.80	10.10	14.05	16.55	15.85	20.65	19.45	
Spokane	.15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20		17.25	21.55	21.05	
St. Louis	.15	8.69	9.94	10.51	8.74	9.08	9.25	9.12	9.56	15.66	15.01	19.01	18.81	
St. Paul	.15	8.94	10.19	10.76	8.99	9.45	9.53	9.37	9.81		15.26		19.06	

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other or with galvanized sheets for quantity.

* 10¢ zinc. † Deduct for country delivery. ‡ 3 1/2 in. to 1/2 in. * C1018—1 in. rounds.

(Effective Sept. 17, 1957)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb.	No. 1 Std. Rail	Light Rail	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Unthreaded
Bessemer U1	5.525	6.50	6.975				
Cleveland R3				9.75			14.75
So. Chicago R3							
Ensley T2	5.525	6.50					
Fairfield T2		6.50		9.75		6.60	
Gary U1	5.525					6.60	
Huntington C16		6.50					
Ind. Harbor I3	5.525		6.975	9.75		6.60	
Ind. Harbor Y1				9.75			
Johnstown B3		6.50					
Juliet U1			6.975				
Kansas City S2				9.75			14.75
Lackawanna B3	5.525	6.50	6.975			6.60	
Lebanon B3			6.975		14.50		14.75
Minnequa C6	5.525	7.00	6.975	9.75		6.60	14.75
Pittsburgh P5							14.75
Pittsburgh J3				9.75			
Seattle B2				10.25		6.75	15.25
Steelton B1	5.525		6.975			6.60	
Struthers Y1				9.75			
Terrace C7							6.75
Williamport S5		6.50					
Youngstown R3				9.75			

COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. \$15.00 to \$15.75
Foundry, beehive (f.o.b. oven) \$17.50 to \$19.00

Foundry oven coke

Buffalo, del'd	\$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Ind., f.o.b.	29.25

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with
nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	24.75	40	100-110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
10	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	40	33.25	8	60	13.30
3	40	35.25			
2½	30	37.25			
2	24	57.75			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, fct allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	43.50
Electrodeposited	33.25
Brass, 80-20, ball anodes, 2000 lb or more	44.00
Zinc, ball anodes, 2000 lb lots	18.00
(fcr elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	102.25
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.70
Tin, ball anodes and elliptical 81.15 per lb	

Chemicals

(Cents per lb, f.o.b. shipping point)	
Copper cyanide, 100 lb drum	74.80
Copper sulphate, 100 lb bags, per cwt.	24.35
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.05
(Philadelphia price 23.30)	
Zinc cyanide, 100 lb	59.00
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1000 lb or more	31.00

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Pct. Discounts

Machine and Carnage Bolts	Full Con- tainer Price	30 Con- tainers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	49	54	56	57
¾" thru 1" x longer than 6"	35	40	43	45
Rolled thread carriage bolts ½" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44½	47	48½
Plow bolts, ½" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.

	Full case or Keg price
¾ in. or smaller	60½
¾ in. to 1 in. inclusive	55½
1½ in. to 1½ in. inclusive	58½
1½ in. and larger	53½

C. P. Hex reg. & hvy.

¾ in. and smaller	60½
¾ in. to 1½ in. inclusive	55½
1½ in. and larger	53½

Hot Galv. Hex Nuts (All Types)

¾ in. and smaller	46½
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Semi-finished Hex Nuts

¾ in. or smaller	60½
¾ in. to 1½ in. inclusive	55½
1½ in. and larger	53½

(Add 25 pct for broken case or keg quantities)

Finished

¾ in. and smaller	63
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Rivets

	Base per 100 lb
½ in. and larger	\$12.25
7/16 in. and smaller	19

Cap Screws

Discount (Packages)
Full Finished H. C. Heat Treat

New std. hex head, pack- aged		
¾" diam. and smaller x 6" and shorter	40	26
¾", ¾", and 1" diam. x 6" and shorter	22	3
¾" diam. and smaller x longer than 6"	8	+13
¾", ¾", and 1" diam. x longer than 6"	6	+32

C-1018 Steel
Full-Finished
Cartons Bulk

¾" through ¾" dia. x 6" and shorter	58	49
¾" through 1" dia. x 6" and shorter	46	33
Minimum quantity—¾" through ¾" diam., 15,000 pieces; 1/16" through ¾" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.		

Machine Screws & Stove Bolts

	Discount	Mach. Screws	Stove Bolts
Plain Finish			
Cartons	19	32	
Bulk			
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	25,000-200,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screws & Stove Bolt Nuts

	Discount	Hex	Square
In Cartons	16	19	
In Bulk			
¾" diam. & smaller	15,000-100,000	7	9

(Iron/steel prices, normally included in this section, will next appear in the Sept. 26 issue.)

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6
Dec. 1955 value, Class B or heavier 5 in. or larger, bell and spigot pipe. Ex- planation: p. 87, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.	

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add \$5.00)	\$135.00
No. 1 Ohio	120.00
Sec. Quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	108.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$2.00)	\$1.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00

Super Duty

Hays, Pa., Athens, Tex., Wind- ham, Warren, O., Morrisville	157.00-160.00
--	---------------

Silica cement, net ton, bulk, Latrobe

Silica cement, net ton, bulk, Chi-

cago

Silica cement, net ton, bulk, Ens-

ley, Ala.

Silica cement, net ton, bulk, Mt.

Union

Silica cement, net ton, bulk, Utah

and Calif.

Chrome Brick

Standard chemically bonded, Balt.

Standard chemically bonded, Curt-

ner, Calif.

Burned, Balt.

Magnesite Brick

Standard, Baltimore

Chemically bonded, Baltimore

Grain Magnesite St. % to ½-in grains

Domestic, f.o.b. Baltimore in bulk.

Domestic, f.o.b. Chewalah, Wash.,

Luning, Nev.

In bulk

In sacks

Dead Burned Dolomite

F.o.b. bulk, producing points in:

Pa., W. Va., Ohio

Midwest

Missouri Valley

Metal Powders

Per pound, f.o.b. shipping point, in ton

lots, for minus 100 mesh

Swedish sponge iron, del. East of

Miss. River, ocean bags, 23,000

lb. and over

F.O.B. Riverton or Camden, New

Jersey, West of Miss. River

Domestic sponge iron, 98+ % Fe,

23,000 lb. and over del'd East

of Miss. River

F.O.B. Riverton, New Jersey, West

of Miss. River

Canadian sponge iron, del'd in

East, carloads

Electrolytic iron, annealed,

imported 99.5+ % Fe

domestic 99.5+ % Fe

Electrolytic iron, unannealed

minus 325 mesh, 99+ % Fe

Electrolytic iron melting

stock, 99.84% pure

Carbonyl iron size 3 to 20

micron, 98%, 99.8+ % Fe. 88.0¢ to

Aluminum, freight allowed.

Brass, 10 ton lots

Copper electrolytic

Copper, reduced

Cadmium, 100-199 lb. 95¢ plus metal value

Chromium, electrolytic, 99.85%

min. Fe. 63 max. Del'd ..

Lead

Manganese f.o.b. Extron, Pa.

Molybdenum, 99%

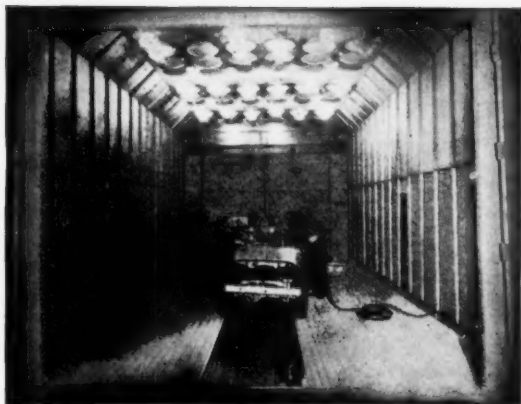
Nickel, chemically precipitated

Nickel, unannealed

Nickel, annealed

Nickel, spherical, unannealed

.....



MACLEOD Custom-Built BLAST CLEANING ROOMS

MACLEOD offers complete designing, fabrication, and installation of abrasive blast cleaning rooms, abrasive reclaiming systems, blast generators, and dust collecting systems—designed to meet your specific needs.

The room installation illustrated was custom-built by MACLEOD for the renovation of various types of military vehicles. It is served by a continuous, automatic blast generator, abrasive reclaiming and cleaning system, and a dust collecting system with a 54,000 cu. ft. per minute capacity. The floor is stressed to support vehicles up to 45 tons. Write for descriptive literature on MACLEOD Blast Cleaning Rooms, Cabinets and Machines.

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ANNIVERSARY
YEAR **The MACLEOD Company**
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Zinc STRIP, COILED
WIRE, COILED
ACCURATELY ROLLED FOR
ELECTRIC FUSE ELEMENTS
EYELETS—BRASS, STEEL AND ZINC
THE PLATT BROS. & CO., WATERBURY, CONN.

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EYE BOLTS
Drop forged from the best mild steel, heat treated to increased tensile strength and proof-tested to 50% beyond rated "safe working load." ARMSTRONG Eye Bolts are strong, dependable and safe. Blank or threaded, "Plain or Shoulder" patterns. 15 standard sizes and special lengths. Write for Catalog.
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"The Tool Holder People"
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GOSS and DE LEEUW

MULTIPLE SPINDLE

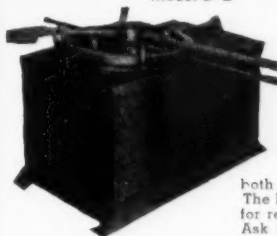
CHUCKING MACHINES

Four, Five, Six, Eight Spindles • Work and Tool Rotating Type
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

KARDONG FOUR-WAY BENDER

For Concrete Reinforcing Steel

Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes. Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models, 1 1/4-inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar benders.

KARDONG BROTHERS, Inc.
MINNEAPOLIS 13, MINN.

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for valuable information on

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The **IRON AGE**

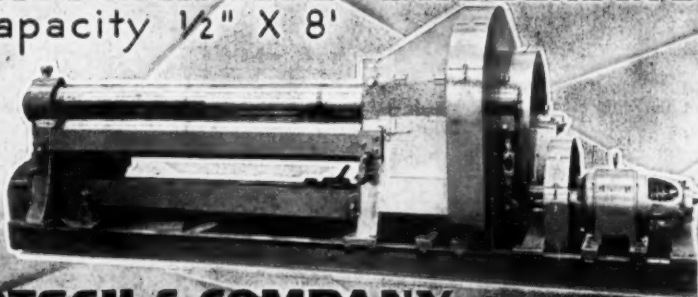
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Low in Cost. Durable. Easy to operate.
Table adjustable for straight or taper keyways.
Three sizes. Keyways 1/16" up to 1".

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400 Exchange St., Rochester 8, N. Y.

INITIAL PINCH TYPE PLATE BENDING ROLL

Capacity 1/2" X 8'



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Light and heavy
machinery for all
classes of sheet
metal, plate and
structural work

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Diesel-Electric

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6—Austin-Western 3—Pressed Steel
Car

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14—40-Ton Capacity

COVERED HOPPER CARS

15—70-Ton Capacity

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6,000- 8,000- and 10,000-Gallon
Cleaned and Tested

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Overhead and Locomotive

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Phone: BEekman 3-8230

**"ANYTHING containing IRON
or STEEL"**

THE CLEARING HOUSE

Market Is Strong At New York

Used machinery dealers there had a good summer, look forward to a good fall and winter.

Ironworkers, presses and tool-room equipment are among the items moving well.

■ Used machinery dealers in the New York area are looking back at a better-than-expected summer. After the summer's good record, they are confident of even better business this fall.

Some claim the fall pickup has already started. Many customers are now putting up cash for machines they looked at weeks ago. One dealer reports he just closed a deal which started with an inquiry two months ago. And new inquiries are coming in at a gratifying clip.

Money Talks—Prices are generally stable. A few dealers fear a dip, but others feel the market structure is solid. Customers generally seem to have learned how to live with tight money, and only a few deals fall through for lack of cash. But one large dealer warns that tight money is hurting many smaller buyers. He says that his customer list is more and more pared down to big firms with better credit resources. This same dealer is also one who fears a price dip. He claims the narrowing of buyers is a prime mover for lower prices.

Demand Strong—Generally, demand is good for all late-model tools in good condition. Especially heavy demand is noted for ironworking equipment of all types, reflecting the continuing high construction pace. Large presses are also in strong demand, with both hydraulic and

mechanical varieties moving well. Toolroom equipment also shows signs of perking up. One dealer who is also an importer of European tools reports the demand for imported machines is very strong.

As in other areas, auctions are bringing high prices. Independent buyers are bypassing dealers, bidding direct at auction sales. They are willing to pay high prices, often bidding against regular dealers, despite the usual disadvantages of auction buying. These include hefty cash deposits, little opportunity for detailed inspection, freight problems and other headaches.

Future Looks Good—Rising prices for new machine tools is seen as a good sign for the used tool business. The rash of new tool orders this summer to beat price advances is taken by many dealers as proof that there is still a strong backlog of demand for machinery of all kinds, both new and used.

Generally, dealers look forward to a good fall and winter season. Any sharp spur to metalworking, such as a heavy load of orders from Detroit, would tighten the market substantially in the fourth quarter. And even without such added stimulus, there are few complaints about present business.

July Sales Declined

Sales of used machine tools decreased 8.6 pct from June levels, according to the index of the Machinery Dealers National Assn. The July index (based on an average of 100 for the years 1947-49) was 125.3, as contrasted with 137.0 for June. Comparisons with the month of July in 1956 are not available.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS

10' x 10" Ga. Bertsch Initial Type
10' x 10" Kling Pyramid Type—LATE
16' x 8" Ransome, Pyramid Type
18' x 15" Niles Pyramid Type

BRACKS—LEAF TYPE

12' x 1/2" Dreis & Krump
12' x 1/2" Dreis & Krump No. 228

BRACKS—PRESS TYPE

12' x 1/2" Cincinnati

CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P&H 50' Span 220/3/60
5 ton Cleveland 60' Span 115 Volt D.C.
8 ton P&H 55' Span 220/3/60
10 ton Shepard Niles 38' Span 440/3/60
10 ton Shaw 120' Span 230 Volt D.C.
15 ton Shepard Niles 52' Span 230 Volt D.C.
15 ton Shepard Niles 55' Span 220/440 A.C.
15 ton Niles 75' Span 220/3/60
20 ton P&H 57' Span 220/440 A.C.
20 ton Shepard Niles 77' Span 220/3/60

CUT OFF MACHINE

#2A Modern Automatic Cut Off Machine, For Pipe, Tubing, Bars to 2" O.D.

FORGING MACHINES

1" to 5" Acme Ajax, National

HAMMERS—BOARD DROP—STEAM DROP—STEAM

FORGING
300, 1000 lb Chambersburg J-2 Board Drop
2000 lb. Chambersburg Board Drop
2000 lb. Erie Type FV Board Drop
2000 lb. Chambersburg Model E Steam Drop
2000, 2500 lb. Erie Steam Drop
3000 lb. Niles-Bennett-Pond Steam Drop
4000 lb. Chambersburg Steam Drop
1100 lb. Erie Single Frame Steam Forging
1500 lb. Chambersburg Seie Fr Steam Forging
20,000 lb. Massey Arch Frame Steam Forging

LEVELLERS—ROLLER

48" Actua 17 Rolls 3 1/2" dia.
66" Actua 17 Rolls 4 1/2" dia.

PLANER

72" x 22" x 16" Detrick & Harvey Four Head

PLANER—PLATE EDGE

25" Southwick, 16 Pne, Jacks, Capy. 1 1/2"

PRESSES—HYDRAULIC

500 ton HPM Fastraverse, Bed 36"x36"
1500 ton Bilas, 15" Stroke, Bed 40"x48"
1500 ton Mesta Steam Hydr. Forging Press
2000 ton Bliss 18" Stroke Bed Area 34"x35"
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESSES—STRAIGHT SIDE

100 ton Clearing F1109, 14" Str. Bed 36"x36"
180 ton Hamilton #847, 12" Str. 8 1/2" Bed Tps.
200 ton Clearing F1200-42, Stroke 30" Bed 44"x38"
250 ton Bliss #88 12" Str. Bed 29"x29"
250 ton Bliss #81 7 1/2" Str. Blstr 33"x39"
1500 ton Verson Knuckle Joint, Bed 48"x48"

PUNCH—BEAM

W&W #11 Beam Punch, Capacity Beams 12" 30"

PUNCH & SHEAR COMBINATIONS

Cleveland Style EF, Arch Jaw, Capy. 1 1/2"x1"
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
No. 15" Buffalo Universal Ironworker

ROLLING MILLS

6' x 5" Torrington Wire Flattening Mill Line
8' x 10" Schmitz Single Stand Two High
10' x 14" Single Stand Two High
10' x 16" Single Stand Two High
12' x 12" Single Stand Two High
12' x 16" Single Stand Two High
12' x 30" Parrel Two Stand Two High
20' x 36" Single Stand Two High
26' x 72" Cold Rolling Mill

ROLL—CORRUGATING

12" Stano, Rolls 21" Dia. Corrugations 2.66"

ROLLS—PLATE STRAIGHTENING

12" Niles, 1 Roll, 8" Dia, Motor Driven

SHEAR—ALLIGATOR

No. 1 Mesta RH LK, Capacity 2" x 12"

SHEAR—GATE

12' x 3/4" Niagara Model 1212, NEW 1951

SHEAR LINES

36" x #20 Ga. Halliden Shear Line

60" x 7 Ga. Shear Line

90" x 14 Ga. Cleveland Shear Line

SHEARS—SQUARING

6' x 10 Ga. Niagara No. 672

8' x 1/2" Niagara—New 1952

10' x 1/2" Cincinnati #1810

10' x 3/4" Cincinnati #2510

SHEARS—ANGLE

6' x 1/2" Niles & Jones

4' x 1/2" Long & Allstatter

SLITTERS

24" Voder Slitting Line

36" Paxon Slitting Line

42" Illinois, 4 1/2" Shaft Dia.

STRAIGHTENERS

No. 2 Medart 3 Roll, Capacity to 4 1/2" Tubing

Kane & Rouch Roll Straightener & Cut-off Capacities

7, 10" to 3" Hot Bars

SWAGING MACHINES

#1 Penn. Capacity 2 1/2" Tube 3 1/2" Solid 10"

#2 1/2" Tube 3 1/2" Solid 10"

WIRE MACHINERY

#2 Vaughn 12 Die Continuous Wire Drawing Machine

Capacity 14 to 27 R&T Tube 3 1/2" Solid 10"

4—Ritch Vaughn Wire Drawing Machine 22" Diameter

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HIGH GRADE TOOLS

7 1/2" National high duty air clutch forging and upsetter

4" National high duty upsetting and forging machine, late (2)

3"-3 1/2" Ajax upsetting and forging machine, steel frame

3" National high duty upsetter, air clutch

3" Ajax upsetter, air clutch

1 1/2" National upsetting and forging machine, hardened ways (2)

Economy Type R automatic threading or pointing machines, 1948 (2)

10 1/2" x 10 1/2" No. 3 Motch & Merryweather cold saw, late, MD

10" x 10" Racine hydraulic Shear-Cut metal saw

750 ton No. 3 National Maxipress, air clutch, new 1945

60 ton No. 600 B Perkins OBI press, new 1950

800 ton Model 2E48-800 Hamilton straight side single crank, air clutch

250 ton Williams White & Co. four post upward working hydraulic press

150 ton HPM Hydro-Power Fastraverse hydraulic press

350 ton No. 18T Cleveland single crank double action toggle drawing press

260 ton No. 795/2-72 Toledo double crank toggle drawing press

200 ton 7-72" Bliss double crank straight side tie-rod frame press

126 ton Model 60-D-66 Cleveland straight side double crank tierod frame single geared press

600 ton No. 664 Toledo tierod frame knuckle joint coining press

400 ton No. EG 54 Ferracuto upward working coining press

30" x 30" x 8" Cincinnati Hypro 2 rail, one right hand side head, dial feed planer

Economy type KK automatic bolt head shaving and pointing machine

Ask for your list No. 206.

MILES MACHINERY CO.

PHONE SAGINAW PL 2-3105

2041 E. GENESEE AVE. SAGINAW, MICH.

6' x 1/4" Lown Initial Type Bending Roll, M.D.
No. 1/2, No. 1 1/2 Buffalo Forge Univ. Ironworkers, Coper, Notcher, M.D.

FALK MACHINERY COMPANY

16 Ward St. Baker 5807 Rochester 5, N. Y.

RE-NU-BILT

GUARANTEED

ELECTRIC POWER EQUIPMENT DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	Elliott		475	250
1	2250	Elliott		600	200/300
1	2200	G.E.	MC	600	400/500
1	1750	Elliott		250	175/350
1	1375	G.E.	MC	415	1300
1	1200	G.E.	MC	600	450/600
1	940	Whse.	QM	250	140/170
3	800	G.B.	MC	250	400/750
3	450	Whse.		550	415
2	300	G.E.	MP	250	400
2	200	Whse.	CB-207.4	250	850/1200
2	125	Whse.	8K-190	230	450/1200
1	1200	G.E.	CD-B	600	250/700
1	150	Cr. Wh.	65-B	230	1150
1	125	Whse.	8K-185	230	350/1050
1	125	Whse.	8K-183	230	850
2	100	Whse.	8K-181	230	450/1000
1	60/100	G.E.	RF-17	230	450/900
1	75	G.E.	CD-1231	230	850
2	75	Cr. Wh.	53HTEP	230	860
1	50	G.E.	MD-412-AE	230	550
6	40	Rel. BB	385PTEFC	230	500/1500
2	30/40	Whse. D.P.	SK-131.5-BB	230	500/1500
3	(unused)	30 G.E.	CDM-85-BB	230	2200

MG SETS—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	Volts	AC Volts
2	2000/2400	G.E.	450	250/300	2300/4600
1	2000	G.E.	514	600	2300/4600
2	1750/2100	G.E.	514	250/300	2500/4600
2	1000	G.E.	720	600	6600/13200
1	750	G.E.	720	125/250	2300/4600
1	500	Whse.	900	125/250	440
1	500	G.E.	900	125/250	440/2300
2	300	G.E.	1200	250	2300
1	300	Whse.	1200	275	440/2300
1	250	Whse.	1200	275	2300
1	200	El Ma.	1200	250	2300/4600
1	200	Whse.	1200	550	2300
1	200	G.E.	1200	250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltagess
3	3333	Whse.	OISC	1	13800 x 2300
1	3000	A.C.	OISC	3	33000 x 2300
1	1500	G.E. auto	HT	3	4000/4200/4400
3	1000	G.E.	HVDDJ	1	2400 x 480
3	1000	G.E.	GA/FA	1	13800 x 230/160
1	833	G.E.	TA	1	13800 x 460
2	750	G.E.	Pyranol	1	4800 x 83/55
3	500	Kuhl	OISC	1	13200 x 6600
3	500	Kuhl		1	4800/2400 x 240/480
1	300	G.E.	HT	3	4160 x 480/277
3	200	Al. Ch.	OISC	1	2300 x 230/460
3	150	G.E.		1	33000 x 2300/4000Y

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47 Howell Street, Jersey City 6, N. J.



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800 TON MILES WHEEL PRESSES

(2) Late Type 800 ton Wheel Presses, 96" between bars; max. dist. ram and resistance head 93" wt. each 65,000 lbs.
(1) 32" Ohio Dreadnaught Shaper, M. D.

375 Allwood Rd., Clifton, New Jersey

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2000# Chambersburg Pneumatic Forging Hammer, Late Type, Serial 20CH392L7.

4000 lb. Chambersburg Double Frame Steam Forg. Hammer

2500 lb. Erie Single Leg Steam Forg. Hammer

Pels FV-75 All Steel Billet Shear Cap. 7 1/4" Rd.

United Engineering & Fdry. Alligator Shear Clutch operated; Cap. 6 1/2" Sq.

3-2-ton Denison Auto. Hopper Feed & Index Table Hydr. Multipress

2500 lb. Model E Chambersburg Steam Drop Hammer, New 1944

6' x 10 ga. Cincinnati Squaring Shear

1/4" x 8' Pexto Gate Shear; 20" throat

4" National High Duty Upsetting & Forging Machine, air clutch, also one with regular clutch, also 1", 2", 3" air clutch

Williams White Bulldozers from 5-ton to 300-ton

Landis Landmaco and other Landis Threading Machines

Single & Double End Punches

No. 3 Motch & Merryweather Saw, with Saw Grinder

Conomatic, 4 Spin. Cap. 1 1/2" Rd.

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES.

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THE CLEARING HOUSE

1—28" x 40" HOT STRIP MILL, 2-high, reversing with 2500 HP D.C. motor, etc.
 2—28" 3-HIGH ROLL STANDS with inlet, outlet and intermediate tables. Will produce 4" sq. billets from 8" sq. blooms in 6 passes. Includes bloom shear.
 1—28" REVERSING BREAKDOWN MILL.
 1—25" x 42" x 60" HOT STRIP MILL, 4-high.
 1—28" PINION STAND, 2-high, modern design.
 1—17½" x 28" 2-HIGH ROUGHING MILL, motor screwdown, upcutter.
 1—10" x 10" 2-HIGH COLD MILL, combination pinion stand and gear, extra forged steel rolls.
 1—16" BAR MILL, 3-high, 4-stands, with speed reducer.
 1—10" ROD MILL.
 1—BAR MILL, 3-high.
 1—COIL BUILD-UP LINE Capacity strip 36" max. width by 230" max. thickness.
 1—14" x 192" ROLL GRINDER.
 1—44" ROLL LATHE, enclosed headstock, tailstock, main rest, 20 HP 500 1500 RPM, 230 volts D.C. motor and controls.
 1—ROLLER LEVELER, McKay, rolls 80" face & 9½" dia. with gear box and universal spindles.
 1—ROLLER LEVELER, 42" McKay, back-up.
 1—STRETCHER LEVELER for sheets, 500,000 lb.

1—KANE & ROACH BAR AND ANGLE STRAIGHTENER, size 25, cap. 4" x 4" x ½" angles, 5" channels 2½" bars.
 2—KANE & ROACH BAR AND ANGLE STRAIGHTENER, size 24, cap. 3" x 3" x ½" angles, 3½" channels and 2" bars.
 1—LOCOMOTIVE, 62½ ton Diesel Electric.
 2—UNITED HOT SAWS, 50", sliding frame.
 1—BONNOT BILLETEER, size "A" cap. 3" to 6" Squares.
 1—UNITED 24 BAR SHEAR vertical open side.
 1—UNITED BAR SHEAR, 14" blades, vertical open side.
 1—ROTARY SIDE TRIMMING SHEAR, capacity 112" x ½" plate.
 1—192" x 10 GAUGE NIAGARA SQUARING SHEAR, little used.
 1—156" x ½" SHEET SQUARING SHEAR.
 1—SLITTING SHEET FOR SHEETS, Mesta 92".
 1—TANDEM SLITTING AND CUT-TO-LENGTH LINE, heavy duty, max. opening for 36" wide.
 1—MORGAN INGOT STRIPPER CRANE, 50" span, 200 tons capacity, 230 volts D.C.
 1—ALLIANCE LADLE CRANE, 4 girders, 30 ton main hoist, 25 ton auxiliary, 55'5" span, 42' lift.

1—CORRUGATING MACHINE, Stameo, for 12" wide sheets, including several sets of removable dies.
 1—DRAWBENCH, Mesta, oil-hydraulic, for 3 strands of bars 20" long.
 2—PICKLING MACHINES for sheets, Mesta.
 2—60-TON CAPACITY HOLDING FURNACES, electric, each with 7500 KVA transformer.
 2—PACK FURNACES for hot sheet mills, 62" x 60", double chamber.
 1—15-TON ELECTRIC MELTING FURNACE, top charge.
 1—60" GALVANIZING LINE for sheets, with 2 roller levellers.
 1—3500 HP GEAR DRIVE, 514 to 80 RPM, 6.45 to 1 ratio.
 1—1605 HP GEAR DRIVE, 514 to 87 RPM, 5.9 to 1 ratio.
 1—1200 HP GEAR DRIVE, 353 to 94.6 RPM, 3.73 to 1 ratio.
 2—35 HP SPEED REDUCERS, Falk 21 to 1.
 1—3500 HP MOTOR, 11000 volts, 3 phase, 60 cycle, 514 RPM.
 1—1200 HP MOTOR, 2200 volts, 3 phase, 60 cycle, 553 RPM.
 1—50 HP MOTOR, GE frame MD-610-AE, 230 volts, 500 RPM.

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1	1450	Wise	1000	600	1000-2000
2	1250	AL Ch.	720	600	1000-2000
1	125	Wise	900	600	1000-2000
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1	1800	Wise	2300	252
1	1750	Wise	2200	231
3	1500	G.E.	6000	113
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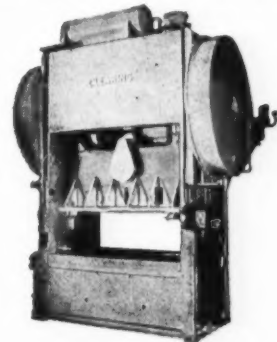
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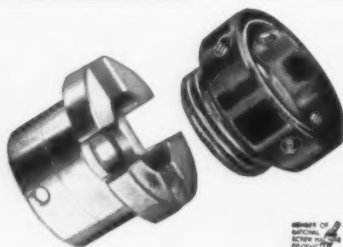
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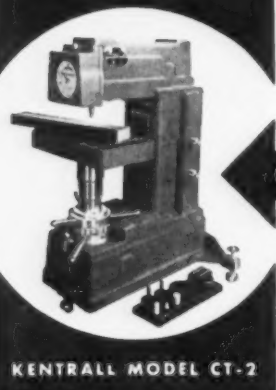


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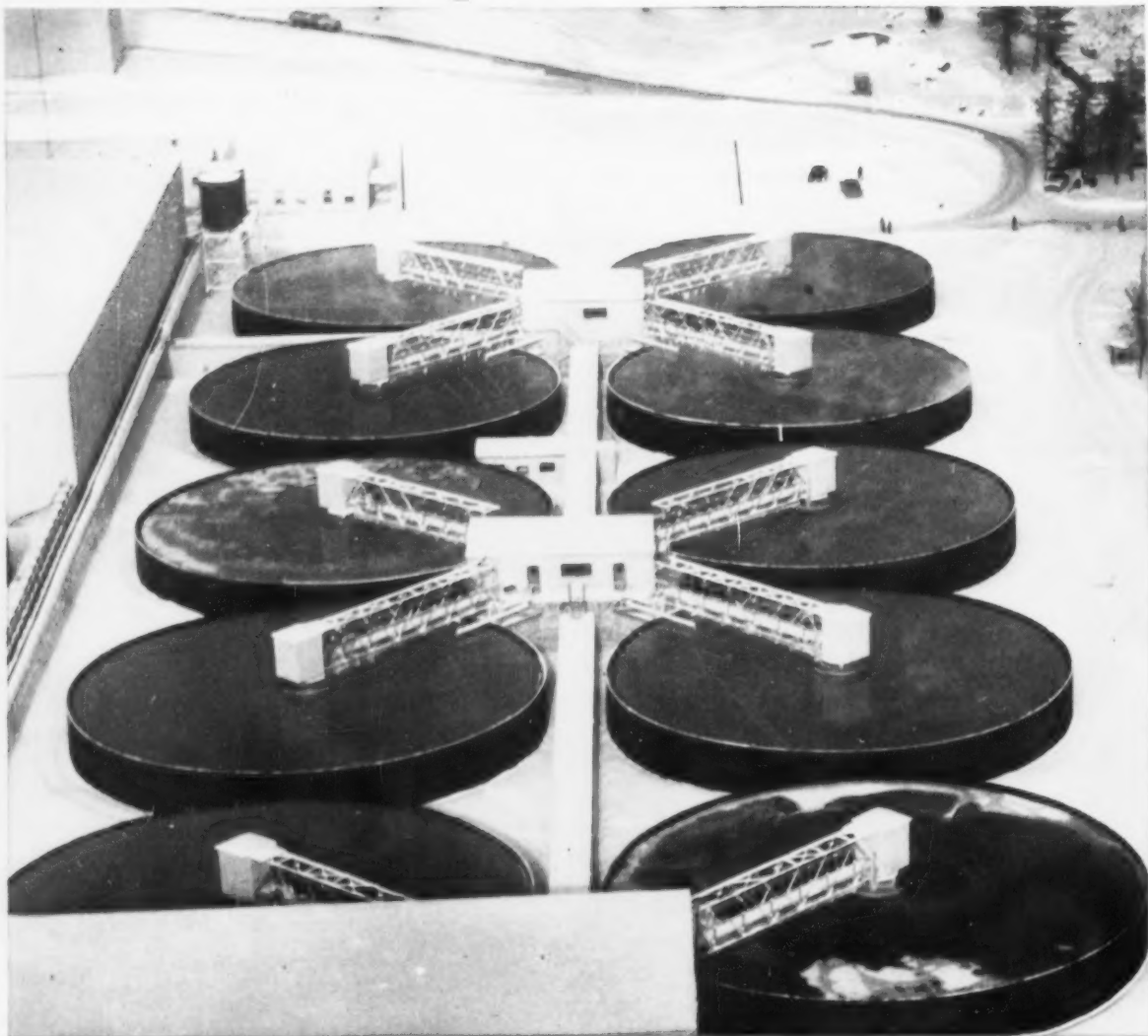
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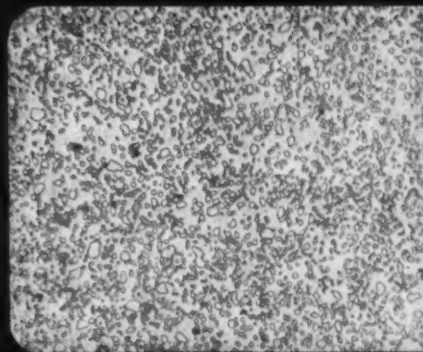
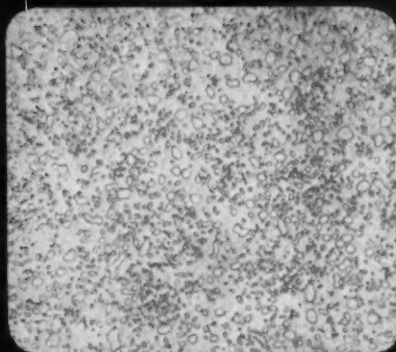
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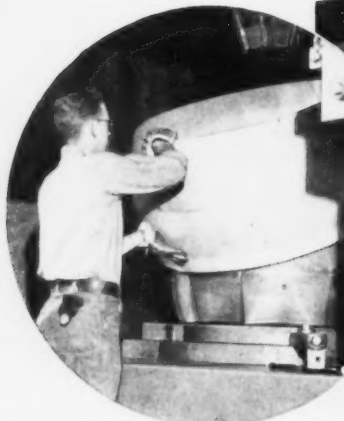
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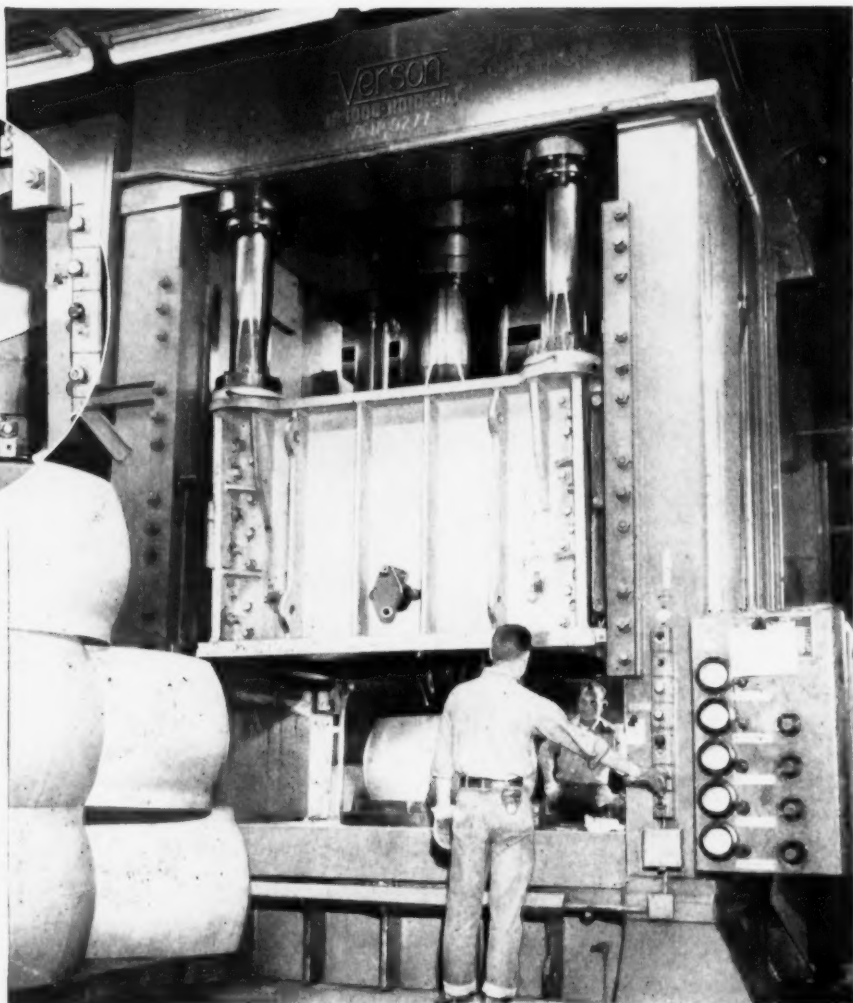
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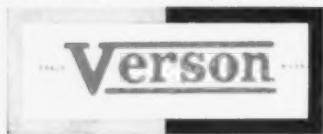
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